

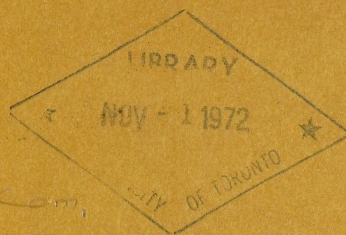
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Ontario Hydro Annual Report 1971

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Hydro-electric Power Com.



The Commission

GEORGE E. GATHERCOLE, LL.D., *Chairman*

D. ARTHUR EVANS, M.P.P., *Vice-Chairman*

LT. COL. A. A. KENNEDY, D.S.O., E.D., *Commissioner*

DR. J. D. FLEMING, *Commissioner*

LOU E. DANIS, *Commissioner*

ROGER N. SÉGUIN, C.R., LL.D., *Commissioner*

E. B. EASSON, *Secretary*

D. J. GORDON, *General Manager*

D. B. IRELAND,
Assistant General Manager — Regions and Marketing

M. NASTICH,
Assistant General Manager — Finance

O. S. RUSSELL,
Assistant General Manager — Personnel

H. J. SISSONS, M.B.E.,
Assistant General Manager — Services

H. A. SMITH, M.B.E.,
Chief Engineer

Head Office, 620 University Avenue, Toronto 101, Canada

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George E. Gathercole, Chairman

May 23rd, 1972.

The Honourable W. Ross Macdonald, P.C., C.D., Q.C., LL.D
Lieutenant-Governor of Ontario

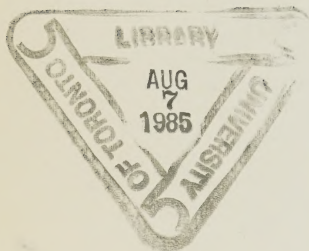
Sir:

I take pleasure in submitting herewith the Annual
Report of The Hydro-Electric Power Commission of Ontario for the
year 1971.

Respectfully submitted,

George E. Gathercole
Chairman

Chairman's Foreword



For Ontario Hydro, 1971 was a most eventful year, in which 1.3 million kilowatts of new generating capacity were added, raising total system capacity to 13.9 million kilowatts.

The primary peak demand reached 11.5 million kilowatts in December. It was much less than expected, owing mainly to the unseasonably mild weather and a slower rate of industrial growth. With the return of colder weather, a new peak of 11.9 million kilowatts was recorded in January 1972.

Primary energy supplied in 1971 amounted to 68.1 billion kilowatt-hours. The increase of 6 per cent over primary energy supplied in 1970 was down from the previous year's increase of 8.2 per cent. This slackening in demand reflected the more moderate pace of the economy and weakening markets for some of our large industrial customers.

While loads, both peak and energy, grew more moderately in 1971, there is no reason to expect that loads in future years will follow this pattern. If economic recovery is sustained, we can confidently expect much higher growth rates in the years ahead. Our construction program, therefore, is being vigorously maintained.

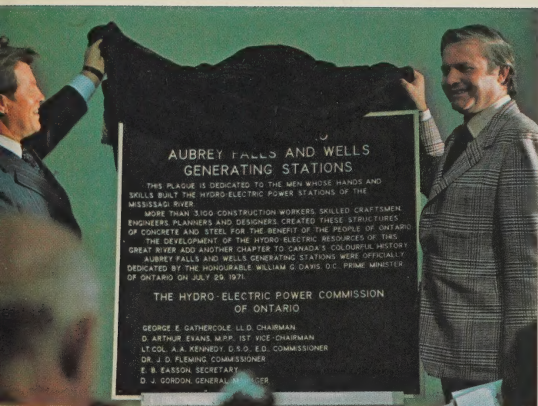
It is not our purpose to urge unrestrained expansion in the use of electricity and so compound our problems, technical, social, and financial. We seek only to develop the use of electricity in a rational way in order to derive the maximum economic and social benefit from the facilities required to sustain Ontario's prosperity. Electric power and energy are the present means to achieving a modern industrial structure and a desirable standard of living consistent with a clean environment.

Over half of our generating capacity is now in thermal-electric stations. With the mounting pressure to control, and where possible reduce, atmospheric pollution, the choice of fuel for these stations becomes a matter of prime importance. The choice, which depends on availability, price, and thermal efficiency, must be made from nuclear fuel, coal of various qualities, gas, and crude or residual oil. When Lennox GS is in service in 1974, the Commission will have major stations based on each of these fuels.

In general, however, our program for providing a reliable supply of electricity and combating the rise in operating costs calls for the maximum use of hydraulic generation, the operation of nuclear-fuel generation to supply base load, and the use of fossil-fuel thermal stations, supplemented by resources outside the Province when power and energy can be purchased at competitive prices.

The development and administration of resources to meet the steady growth of power requirements pose a demanding task, but one which Ontario Hydro's skilled staff is well qualified to undertake.

During 1971, following seven years of design, construction, and manufacturing, the first two 540,000-kilowatt nuclear-electric units at the 2.2-million-kilowatt prototype Pickering



The Chairman of the Commission, with the assistance of Hon. William Davis, Premier of Ontario, unveils the plaque commemorating the official opening on July 29, 1971 of Aubrey Falls GS and Wells GS. These stations on the Mississagi River had been placed in service in 1969 and 1970 respectively.

GS were brought into service. The first unit progressed from start-up in February to full power in three months, and the second, which started up in September, reached full power in under two months. Both units continued to operate at better than 80 per cent power capacity, a level that would be remarkable even for conventional fossil-fuel stations. On-power refuelling — formidably complex but one of the distinctive advantages of the CANDU reactor — has been successfully achieved. The third unit at Pickering GS is scheduled for operation in the spring of 1972, and the fourth in 1973.

In addition to the nuclear capacity at Pickering GS, the 228,000-kilowatt Lower Notch hydro-electric station was also brought on stream in time to meet the winter peak demand.

Our staff in planning and in generation and transmission projects, as well as construction forces in the field, are now engaged in pursuits necessary for meeting the loads forecast for the years ahead. The construction program committed and under way at the end of 1971 for completion by 1978 will add slightly more than 10 million kilowatts of new generating capacity, of which 4.3 million kilowatts will be nuclear.

A seemingly less tractable problem now facing the

Commission is the divergence in its revenues and costs. Costs, including interest on the Reserve for Stabilization of Rates, exceeded revenues by approximately \$14 million, and a net withdrawal of this amount was made from the reserve to cover this deficiency in revenue. Since the two major elements in this accounting, however, are offsetting items in the reserve, the net result of this and other lesser adjustments is an increase in the reserve from \$247,829,000 to \$252,940,000.

Normally, rate adjustments take place on January 1, and it was expected that a rate increase to the municipal utilities and direct customers would be introduced, effective at the beginning of 1972. However, in view of the high level of unemployment and the uncertainty of economic conditions, the Commission in late October 1971 decided to defer the increase to avoid blunting the special government measures adopted to stimulate employment and income during the difficult winter months. The resultant deficiency in revenue is to be met by a withdrawal from the Reserve for Stabilization of Rates.

The Commission and the municipal utilities clearly recognized that this relief could only be temporary, that revenues must eventually equal costs. Reliance on the Rate Stabilization Reserve can only be short-term. The purpose of this reserve is to smooth out rate increases. It is folly to expect it to counter a persistent upward trend in costs. The reserve should be maintained at a level having some appropriate relationship to the Commission's total annual costs and other obligations. There must be inputs as well as outputs; otherwise it cannot perform its basic function of modifying the sharp fluctuations in costs that occur from time to time.

At the 63rd Annual Meeting of the Ontario Municipal Electric Association in late February 1972, the announcement was made that in order to bring revenues more closely in line with rising costs, there would be an 8 per cent increase in interim rates to municipal electrical utilities, effective July 1, 1972. This increase had the support of the Power Costing Committee of the Ontario Association of Municipal Electrical Utilities. Since contracts with direct industrial customers are in force for the calendar year from January to December, rates for service to these customers must await adjustment later, together with rates for retail service in the Power District.

Inflation, reflected particularly in high rates of interest on borrowed capital and rapidly rising costs for labour and materials, has been the major factor in pushing up costs faster than revenue. The effects of two other factors, however, are also being increasingly felt. One is the need for higher expenditure on environmental protection as we move from a once completely hydro-electric system to a more and more predominantly thermal-electric system. Another is the requirement for wider margins of reserve capacity to compensate for the higher outage rates associated with thermal-electric facilities.

During the year, the Government of Ontario appointed two committees — Task Force Hydro, and the Advisory Committee on Energy. Task Force Hydro was created to review Ontario Hydro's function, structure, operation, financing, and objectives; the Advisory Committee on Energy is to review the Province's future energy requirements and resources, and to recommend policies and means to ensure that energy requirements are met. In view of the far-reaching objectives of these two bodies, their reports, to be presented in 1972, are expected to have a determining influence on Ontario Hydro's future operations.

The staff has co-operated most helpfully in assisting these Committees to make their studies meaningful. It has been my experience that this is a typical response on the part of Hydro employees, and I take this opportunity of thanking them for the continued evidence of their loyal and willing service.

Early in June, we were pleased to welcome to Ontario delegates from the Central Electricity Generating Board of Great Britain and the Tennessee Valley Authority. Later in the year, in October, the Premier of the USSR, Mr. Alexei Kosygin, paid a visit to the Pickering Nuclear Station.

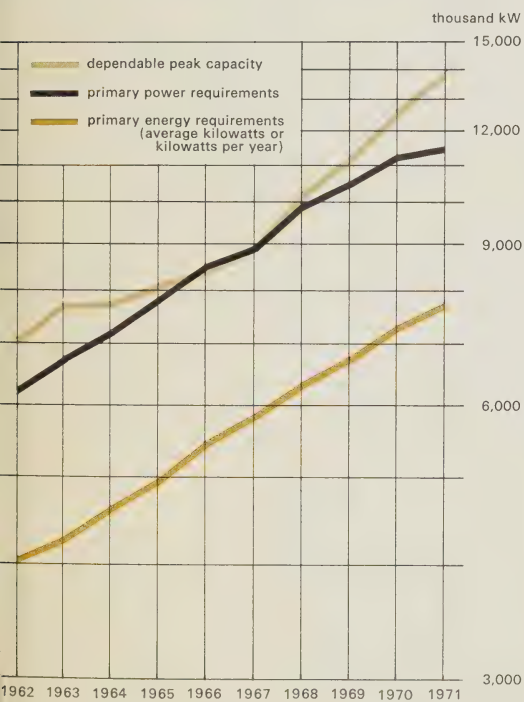
Mr. Robert Boyer resigned from the office of Vice-Chairman during the year, and was succeeded by Mr. D. Arthur Evans, a member of the Provincial Legislature. Two other Commissioners, Mr. Lou Danis and Mr. Roger Séguin, were also appointed. I wish to thank my fellow Commissioners, our General Manager and Assistant General Managers, and all members of the staff for their unfailing attention to the Commission's affairs. I also wish to thank the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities for their co-operation and understanding in our joint enterprise of supplying the electrical needs of Ontario.

Editorial Note

For many years the Commission has issued Annual Reports in two distinct formats, one a brief illustrated booklet entitled Ontario Hydro for the year of issue, and the other later in the year as a more comprehensive official publication which included financial statements of the associated municipal electrical utilities and supplementary statistical data of interest primarily to them. This year the shorter report, which has been expanded to include additional financial statements on the Commission's operations for the year, will be the official Annual Report. Supplementary data formerly included in the more comprehensive publication will be issued later in the year in the form of a statistical handbook.

Power Production for Today's Requirements

Growth in Demands and Resources 1962-1971



NOTE ON THE RATIO SCALE

In this graph and the graph on the following page, comparison of the rates of change in the three basic variables plotted is of more immediate interest than the arithmetic values of the variables themselves. For that reason a ratio (or proportional) scale has been used in these diagrams for the vertical dimension, rather than the more conventional arithmetic scale.

When plotted on a ratio scale, a specific change in rate of growth will produce the same change in the slope of the curve regardless of position on the scale. When plotted on an arithmetic scale, the slope of a given rate of change would grow increasingly steep as the plotting moves up the scale. Visual comparison of rates of change at different levels is much more convenient on the ratio scale.

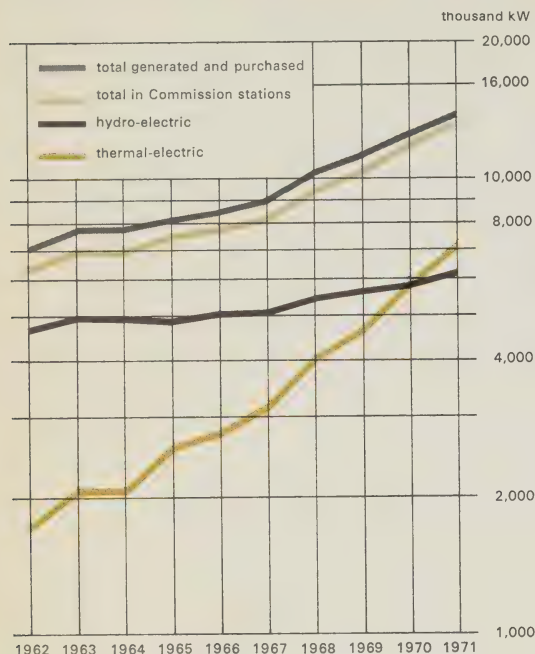
Primary demands on the Ontario Hydro province-wide system reached their 1971 peak on December 22 at 11,535 megawatts to register only a 2.2 per cent increase over 1970 peak demands, which had occurred in that year during a period of much colder weather. With the dependable peak capacity up by 10.0 per cent to a total of 13,941 megawatts, the peak load was met with a fair margin of reserve available. Two nuclear-electric units placed in service at Pickering GS and two hydro-electric units placed in service at Lower Notch GS were the prime contributing factors in this increase in peak capacity. Primary energy requirements for the year accounted for 68,134 million kilowatt-hours of the 72,221 million kilowatt-hours generated and purchased, these totals exceeding the corresponding totals in 1970 by 6.0 and 6.1 per cent respectively. The total contribution by hydro-electric resources at 34,843 million kilowatt-hours was 2.4 per cent lower than in 1970, primarily because of low flows on the Ottawa River. With a 14.2 per cent increase in the output of conventional units, the contribution of thermal-electric resources rose by 25.5 per cent to a total of 28,288 million kilowatt-hours. A significant factor in this contribution was the remarkable performance of the two Pickering GS units, which, in addition to achieving monthly capacity factors of nearly 100 per cent in the latter part of the year, contributed in the month of December more than 11 per cent of the total energy generated by the system. Purchased energy for the year was down by 7.4 per cent to 9,090 million kilowatt-hours.

Operation of the System

Units 1 and 2 at Pickering GS were operated in parallel with the system for the first time on April 4 and October 6 respectively, and the two units at Lower Notch GS similarly on November 2 and December 14. All these units had met full commissioning requirements by the end of the year. Fountain Falls and Upper Notch Generating Stations, in operation since they were purchased from the Northern Ontario Power Company in 1944, were removed from service respectively in June and July 1971. Salvage and demolition were completed prior to the flooding of the headpond for Lower Notch GS.

In November, a new interconnection agreement with Manitoba Hydro came into operation. At various times during the year, a number of other agreements with neighbouring utilities were terminated. These had been negotiated from time to time in recent years specifically for the provision or exchange of interruptible and emergency power. A contract of a quite different kind, the Commission's firm contract for the delivery to Ontario of half the output at Chats Falls GS, expired on September 30, 1971. Ontario Hydro, however, continues to operate the Quebec half of Chats Falls GS on behalf of the Ottawa Valley Power Company, and takes delivery of this power under agreements with Hydro-Quebec.

Dependable Peak Capacity of Resources



Stream Flows and Storage Conditions

Stream flows and storage conditions, though reasonably good on the whole, varied widely across the province in 1971, storage exclusive of the Great Lakes being about 18 per cent above normal in the northwest at the end of the year, and approximately 15 per cent below normal in the east and south. Of the four major rivers on which generating stations are established, the St. Lawrence and Niagara Rivers had mean flows in excess of their ten-year moving averages by 14.1 and 11.4 per cent respectively, the Ottawa and Abitibi River mean flows being correspondingly 15.9 and 12.3 per cent below the averages. At one point in the summer, the Commission, in response to a request from the Ontario Water Resources Commission, operated the Ottawa River stations on base load for almost a month in order to produce uniform flow, so that the pollution effects in the river could be kept to a minimum.

Line Maintenance and Forestry

Following the successful test demonstration during 1970 of the effectiveness of an infra-red camera in detecting overheated conductor connections, a detector unit was purchased and subsequently used during 1971 in four of the seven Regions to examine approximately 21,000 connections in lines and stations. The examination disclosed over 80 overheated connections, which would eventually have failed and caused service interruption. The camera, in conjunction with the display unit, can be operated either from the S58 helicopter or from a panel truck.

A recently developed injection spade now in use in all Regions for the butt treatment of wood poles has contributed to savings of up to one-third of the cost of pole treatment by hand.

Fifteen aluminum guyed towers have been purchased for emergency use on the extra-high-voltage line in the event that service is interrupted by severe tower damage. These replacement towers are equally distributed at Essa, Hanmer, and Porcupine Transformer Stations. A number of crews are qualified by training to erect the towers, and the towers are now being assembled in modules that can be transported by helicopter to the site of the damage, thereby reducing the time required for restoration of the facility.

Helicopters were used in the inspection of 142,000 circuit miles of transmission line, in line maintenance work for resagging conductors and sky wires and for pole replacement, as well as in the construction of new lines.

In the preparation of rights of way and station sites, forestry crews are practising selective cutting of only those trees which would interfere with construction and operation. In the absence of attractive natural features, particularly at station sites and highway crossings, landscape plans are being applied, incorporating such features as earth mounds and the planting of large trees.



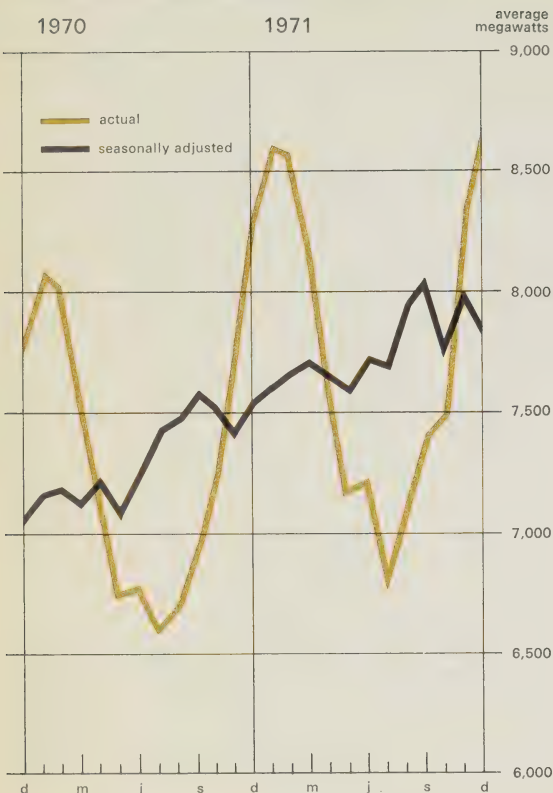
RICHARD L. HEARN GS NOW FIRED BY COAL OR GAS

The equipment in the picture above is part of the extensive installation associated with the change at Richard L. Hearn GS from coal firing to a combination of coal and gas firing.

A major step in the program to reduce and control atmospheric pollution was taken at the station when Unit 5 was fired with natural gas for the first time on September 16, and the exhaust was dispersed high above ground level through the new 700-foot stack, which will serve all eight units. The shorter stacks constructed earlier are being dismantled.



Primary Energy Demand (1970-1971)



ENERGY DEMAND SEASONALLY ADJUSTED

By the application of appropriate statistical factors to the raw data on energy use month by month, it is possible to eliminate the regularly recurring seasonal pattern of load fluctuation so that the prevailing direction of periodic change, and the effect of significant but other than seasonal variables are more clearly apparent.

Generally speaking, the seasonally adjusted line for 1971 indicates continuing growth with little change from the rate experienced in 1970. The uncertain fluctuations in the last quarter reflect the increasing sensitivity of electrical loads to weather factors, the declines both in October and December being primarily attributable to unseasonably high temperatures over a large part of these two months.

Forestry equipment is now being used to transplant trees that are up to six inches in trunk diameter and 25 feet in height, thereby providing immediate screening and improved visual effects. In the general treatment of properties, careful consideration is being given to the retention of low-growing plant species. In addition, grass covers are being established through seeding where this will improve appearance and reduce erosion.

Purchase of Rights of Way

The mounting electrical demands for the province of Ontario will require the construction of hundreds of miles of 500-kV transmission line linking several large new generating stations, and therefore also the acquisition of thousands of acres of right of way. Since much of this right of way must unavoidably traverse prime agricultural land in southern Ontario, the Commission is exploring every reasonable method of alleviating any seemingly detrimental social and environmental effects. The routes proposed are widely discussed with government authorities, both at the provincial and local levels, and with planners and property owners at public meetings in the municipalities affected. The route chosen for the transmission facilities will as far as possible follow township lot lines, for the most part at the back of properties. It will be selected with the purpose of causing the least inconvenience to property owners and a minimum of disturbance to historical sites, conservation areas, or places of scenic beauty. Purchases are made on the basis of fair compensation at current market value to the owner, and expropriation is resorted to only if agreement on price cannot be negotiated. Landscaping and beautification are prime considerations, and policies are now being developed for the multiple use of rights of way as recreation areas, or as service corridors for use by other utilities.

Supply

Coal deliveries in relation to total orders placed were much improved in 1971 and the outstanding performance of the first two nuclear-electric units at Pickering GS effectively eliminated a requirement for the equivalent of 1.2 million tons. As a result, the Commission in the fall of the year had sufficient coal on hand to permit uninterrupted operation of thermal-electric stations during the 1971-72 winter period, despite the protracted strike in the United States coal fields during October and November. Purchases must be increased in 1972, however, to restore emergency stockpiles to acceptable levels. The total value of coal received by Ontario Hydro in 1971 amounted to \$110,000,000.

With the conversion of units at Richard L. Hearn GS for the use of natural gas, deliveries of this fuel began in August. By the end of November, consumption had reached 120 million cubic feet per day. Negotiations are now under way for the supply of oil, whether crude or residual, for the Commission's first oil-fired station at



LOWER NOTCH GS, MONTREAL RIVER

The Commission's most recent hydro-electric development, the 228-megawatt Lower Notch GS, was placed in service on November 2, 1971.

In this picture the eye is drawn not to the station itself, which is shown still under construction at the right, but to the spectacular plume from the spillway as the flip bucket of the chute guides the water upwards and outwards to reduce erosion. The spillway will be used for the most part only during the spring or at other times of unusually high flows.

Lennox GS. Comprehensive studies are being carried out on fuel requirements for the ensuing decade, whether in the form of coal, gas, oil, or uranium. The choice of the most appropriate and most economical fuel for any given station, and the assurance that sources of supply will be dependable are now matters of prime concern.

During 1971, purchase orders were placed with Canadian suppliers for a total of \$294,000,000 for materials, equipment, and services. The orders placed with Canadian suppliers in 1971, taken in conjunction with other orders placed earlier but still outstanding, make a total of \$861,000,000 now in process. This is not only an indication of the magnitude of the Commission's construction program, but a measure of its effect in stimulating the Canadian economy.

Electric Energy for a Clean Environment

Whether by means of an unobtrusive rapid transit train moving freely along its own right of way, or by means of service by other electrically operated vehicles on the street, only the all-electric way offers an expeditious method of mass transportation in a virtually pollution-free environment.

During 1971, the Toronto Transit Commission carried over 186 million passengers in electrically operated vehicles.



Ontario Hydro recognizes that marketing embraces far more than a program to encourage sales and a program of advertising directed to that end. It is rather a code of corporate behaviour by which a supplier correlates every aspect of its relations with its customers. This implies the analysis of customer needs, the provision of a service to meet those needs, the development of a price structure appropriate to the markets served, and finally the administration of the process of service, billing, and customer relationships in a manner that is acceptable to its customers. Recognizing that power users of the province appreciate the efficiency, cleanliness, and economy associated with the use of electric energy, the Commission is primarily concerned to meet their requirements as far as possible by encouraging those uses that best serve the interest of the community at large.

The Marketing Program 1971

Space conditioning and water heating for residential and commercial buildings, and complete environmental control for a variety of farm buildings were the prime areas of emphasis during 1971. Electrical space conditioning has strong customer appeal because it provides not only heating and cooling, but also air purification and humidity control. Because of rising requirements for hot water the 60-gallon water heater under the Cascade designation is now being recommended instead of the 40-gallon heater as the standard rental unit. The introduction during 1970 of preferential insurance rates on electrically equipped farm buildings for poultry raising is a further inducement to producers to use electricity for safe and efficient environmental control.

With the purpose of dealing more adequately and effectively with organizations which control operations in many locations across the province, the Central Sales Group at Head Office was expanded during the year to deal with problems of industrial as well as commercial customers. The establishment of this well co-ordinated approach, backed as it is by special technical competence, provides highly valued assistance to supporting staffs dealing with customers in the Regions and in communities served by the municipal electrical utilities.

Service to Customers

During 1971, power was supplied at cost to 353 municipal electrical utilities for resale to their 1,800,000 retail customers, an estimated total since all returns from the utilities for 1971 are not yet complete. Through its own rural and other distribution facilities, the Commission also provided service to 644,747 retail customers, including 126,273 farm service customers.

No significant change has taken place regarding the status of municipal electrical utilities serving customers within newly constituted regional municipalities. Study and analysis leading to eventual resolution of the problems

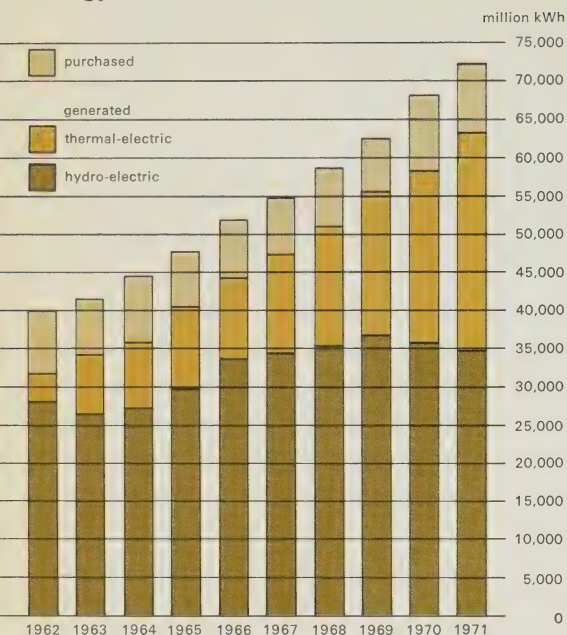


Impressive as this eye-catching display of pyrotechnics may be, it does not tell the even more impressive story that electric induction furnaces at this large iron foundry in Toronto perform their work without the addition of smoke or particulate matter to the atmosphere. Before the foundry was changed over to electric operation, the smoke from its chimney was widely regarded as a major contributor to local atmospheric pollution.



This electrically operated fork lift is one of three used in the Commission's central warehouse. These vehicles perform effectively and quietly on an overnight charge, leaving the warehouse free of noxious hydrocarbon exhaust emission.

Energy Made Available



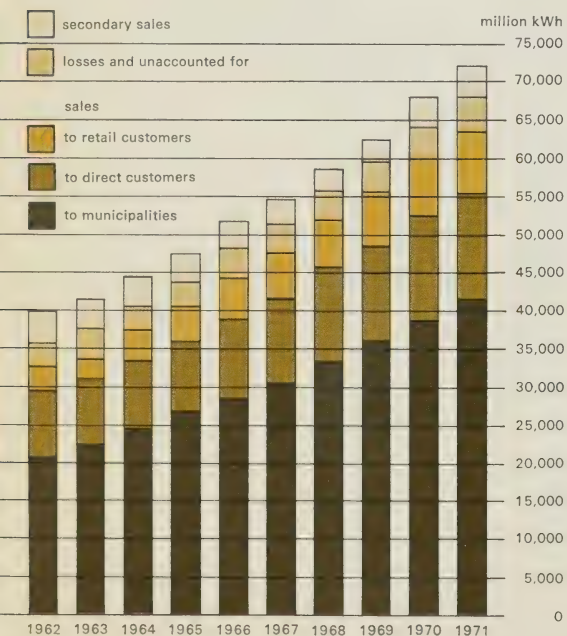
involved will continue until agreements can be negotiated with the new municipalities.

Some 55 miles of 115-kV line were constructed in the Northwestern Region to supply a new mining company engaged in bringing a zinc-copper-lead ore body into production. By mid 1972, the requirements of the company are expected to be in the neighbourhood of 10,000 kW. In Fort Frances, a subsidiary of a large international pulp and paper company has started operation at a kraft mill that will produce, both for use in Ontario and for export to the USA, up to 465 tons of bleached and semi-bleached sulphite pulp per day. The company's power requirements are expected to rise by as much as 12,000 kW.

Increase in Annual Energy Consumption per Customer

The increased rates announced in the 1970 Report became effective on January 1, 1971. Residential customers in the Commission's operation, even those making only seasonal use at summer cottages and winter chalets, nevertheless increased their use of energy, bringing the average consumption per customer for year-round residential service to 9,618 kWh from 9,324 kWh in 1970, and for intermittent-occupancy service correspondingly to 1,975 kWh from 1,786 kWh. Farm service yearly average use rose from 12,305 kWh to 12,746 kWh per customer. Spreading administrative costs in this way over a rising volume of sales has a favourable effect in restraining a rise in the average cost per kilowatt-hour for these services. Some reinforcement of this favourable effect is expected to follow from the gradual introduction of monthly billing based on quarterly meter reading, which will result in more even and therefore more acceptable distribution of charges to customers, as well as improved cash flow to the system.

Disposal of Energy



Rate Policy

In support of the government's policy of seeking to stimulate growth in the economy, the Commission announced in the fall of 1971 its intention to introduce no increase in rates for industrial customers in 1972, or for other customers in the months immediately ahead, deferring until the new year further consideration of whatever steps may be necessary in 1972 to meet continuously rising costs.



BEFORE AND AFTER

An Ontario asphalt manufacturer recently changed a large part of his processing and control equipment to electric operation, and also installed bag filters equipped with electric fans to reduce the particulate matter in the stack emission. The resulting improvement in atmospheric conditions surrounding the plant is effectively demonstrated in these two pictures, which emphasize the fact that electricity is undoubtedly the cleanest form in which energy can be supplied at the point of use.

The Commission's marketing program puts special emphasis on those applications of electric energy which are beneficial in their effect on the environment.



Statistical Summary

	1971	1970	1967	1964	1961
	kW	kW	kW	kW	kW
Peak capacity	13,941,100	12,669,500	8,995,300	7,775,750	6,733,750
Peak demand	11,534,500	11,288,700	8,963,800	7,210,200	5,948,800
	million kWh	million kWh	million kWh	million kWh	million kWh
Primary energy sales					
Municipalities	41,771	38,848	30,534	24,316	19,177
Retail	8,120*	7,560	5,891	4,005	2,975
Direct	13,727	13,680	11,136	9,113	8,600
Total	63,618*	60,088	47,561	37,434	30,752
Secondary energy sales	4,073	3,728	3,164	3,681	4,055
Number of customers	2,438,000*	2,388,561	2,245,715	2,095,754	1,938,897
	kWh	kWh	kWh	kWh	kWh
Average annual consumption per customer					
Municipal residential	8,350*(1)	8,002	7,089	6,209	5,820
Farm	13,000*	12,305	10,158	8,006	6,501
	circuit miles	circuit miles	circuit miles	circuit miles	circuit miles
Miles of line					
Transmission	21,915	21,208	19,492	18,826	17,971
Rural distribution	52,532	51,777	50,316	49,173	48,068
	thousand dollars	thousand dollars	thousand dollars	thousand dollars	thousand dollars
Bonds issued	500,587	485,000	309,575	140,000	100,000
Revenues	606,749	534,426	366,716	288,814	235,696
Assets	5,063,726	4,612,608	3,443,349	2,824,452	2,702,227
Staff (average for year)	23,264	22,584	16,651	14,531	15,097

*Preliminary

(1) Excludes retail customers in municipal systems operated by the Commission. These are included in earlier years.

Financial Review

Revenues in 1971 were 13.5 per cent greater than in 1970, rising by \$72.3 million to \$606.7 million. A combination of increases in rates and increases in demands for power and energy accounted for the additional revenue. The increases in revenue were \$46.6 million or 14.3 per cent from municipalities, \$17.9 million or 14.9 per cent from retail customers, and \$7.8 million or 8.9 per cent from direct customers.

Costs, before provision for the stabilization of rates and contingencies reserve, rose from \$516.5 million in 1970 to \$604.9 million in 1971. Operation, maintenance, and administration expense increased by \$29.5 million. The cost of fuel used in the generation of electric power exceeded the corresponding cost in 1970 by \$28.4 million, reflecting not only increases in the price of fuel, but also the increasing dependence on thermal-electric generating facilities to meet the growth in customer requirements. Because of the increase in borrowings in total and the effect of high interest rates, interest expense rose by \$11.3 million. The method of providing depreciation was revised from sinking fund to straight line for certain fixed assets, effective January 1, 1971. This change and the continued growth of fixed assets in service resulted in the provision for depreciation being \$15.0 million higher than in 1970.

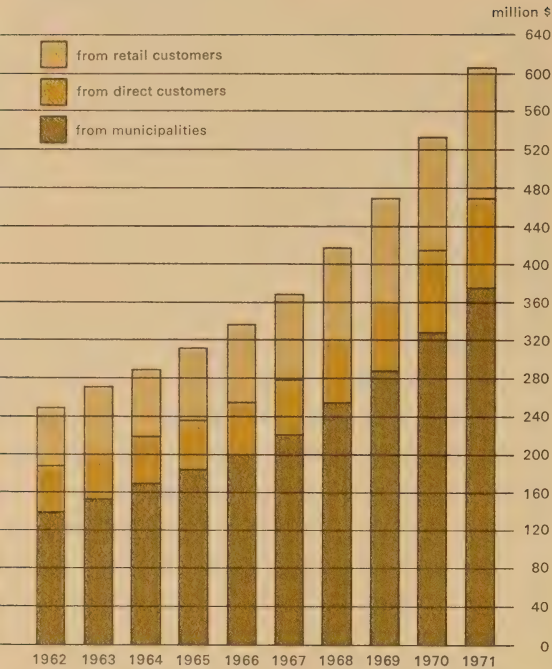
Expenditures on fixed assets during the year amounted to \$507.3 million, including \$316.3 million on thermal-electric generating facilities, \$111.4 million on transformer stations and transmission lines, and \$36.2 million on retail distribution facilities.

Expenditures on thermal-electric generating facilities include \$119.7 million on Nanticoke GS, \$95.4 million on Bruce GS, \$56.4 million on Pickering GS which is only the Commission's share of the total at this station, and \$20.8 million on Lennox GS.

The Commission's debt from borrowings amounted to \$3,635.3 million at December 31, 1971, as compared with \$3,276.2 million at December 31, 1970. The net increase of \$359.1 million during the year represents an increase of \$363.4 million in bonds payable and a decrease of \$4.3 million in notes and advances. During 1971 the Commission issued bonds amounting to \$335.0 million in Canadian currency, \$136.2 million in U.S. currency, and DM 100.0 million in West German currency.

The balance in the reserve for stabilization of rates and contingencies amounted to \$252.9 million at the end of 1971, up \$5.1 million from the balance at the end of 1970. The reserve is used to stabilize the effects on cost brought about by variations in stream flows, loads varying from the levels forecast, major physical damage to plant and equipment or their premature retirement, fluctuations in exchange on debt payable in foreign currencies, and other contingencies.

Revenues



Auditors' report

We have examined the balance sheet of The Hydro-Electric Power Commission of Ontario as at December 31, 1971 and the statements of operations and source and application of funds for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Commission as at December 31, 1971 and the results of its operations and the source and application of its funds for the year then ended.

Toronto, Canada
March 30, 1972

CLARKSON, GORDON & CO.
Chartered Accountants

The Hydro-Electric Power Commission of Ontario

Statement of Operations

for the Year Ended December 31, 1971 (with comparative figures for 1970)

Revenues

	1971 \$ '000	1970 \$ '000
from Municipalities	373,350	326,753
from Retail Customers	138,460	120,531
from Direct Customers	94,939	87,142
	<u>606,749</u>	<u>534,426</u>

Costs

Operation, maintenance, and administration	199,604	170,086
Fuel used for electric generation	112,369	84,002
Power purchased (note 1)	31,369	32,407
Nuclear agreement — payback (note 2)	2,236	—
Interest (note 3)	129,103	117,835
Depreciation (note 4)	80,336	65,290
Debt retirement	52,543	47,640
Amortization of frequency standardization	20,324	18,729
Sales of secondary energy (note 1)	(22,940)	(19,503)
Total before reserve provision/withdrawal	604,944	516,486
Provisions and withdrawals — reserve for stabilization of rates and contingencies:		
Interest added to the reserve	15,562	13,688
Provision (withdrawal) — all customers	(12,064)	7,700
Withdrawal to offset net deficit on sales to retail and direct customers	(1,693)	(3,448)
	<u>606,749</u>	<u>534,426</u>

See accompanying notes on page 21

The Hydro-Electric Power Commission of Ontario

Balance Sheet

as at December 31, 1971 (with comparative figures for 1970)

Assets

Fixed Assets

	<u>1971</u> \$ '000	<u>1970</u> \$ '000
Fixed assets in service, at cost (note 2)	4,286,294	3,898,965
Less accumulated depreciation	<u>762,071</u>	<u>701,251</u>
	3,524,223	3,197,714
Fixed assets under construction, at cost	<u>776,097</u>	<u>689,218</u>
	<u>4,300,320</u>	<u>3,886,932</u>

Investments (note 5)

Investments held for		
Reserve for stabilization of rates and contingencies	202,830	207,264
Debt retirement fund	51,547	50,139
Employer's liability insurance fund	<u>4,177</u>	<u>4,170</u>
	<u>258,554</u>	<u>261,573</u>

Current Assets

Cash and short-term investments (note 6)	150,448	151,450
Accounts receivable (note 2)	138,487	94,024
Fuel for electric generation, at cost (note 7)	79,929	69,175
Materials and supplies, at cost	<u>29,496</u>	<u>27,789</u>
	<u>398,360</u>	<u>342,438</u>

Deferred Charges and Other Assets

Frequency standardization cost, less amounts written off	48,896	66,813
Debt discount expense, less amounts written off	37,378	34,613
Long-term accounts receivable	10,071	9,158
Other assets	<u>10,147</u>	<u>11,081</u>
	<u>106,492</u>	<u>121,665</u>
	<u>5,063,726</u>	<u>4,612,608</u>

Debt, Equity, and Liabilities

Debt from Borrowings

	1971 \$ '000	1970 \$ '000
Bonds payable (note 8)	3,418,179	3,054,760
Notes payable (note 9)	217,100	220,750
Advances from the Province of Ontario (note 10)	—	701
	<u>3,635,279</u>	<u>3,276,211</u>

Equity

Equities accumulated through debt retirement charges	818,725	766,189
Reserve for stabilization of rates and contingencies	252,940	247,829
Contributions from the Province of Ontario as assistance for rural construction (note 11)	<u>126,695</u>	<u>124,796</u>
	<u>1,198,360</u>	<u>1,138,814</u>

Current Liabilities

Accounts payable and accrued charges	147,507	127,306
Accrued interest	<u>71,786</u>	<u>60,259</u>
	<u>219,293</u>	<u>187,565</u>

Deferred Liabilities

Customers' deposits	2,874	3,116
Employer's liability insurance fund	<u>7,920</u>	<u>6,902</u>
	<u>10,794</u>	<u>10,018</u>
	<u>5,063,726</u>	<u>4,612,608</u>

See accompanying notes on page 21

The Hydro-Electric Power Commission of Ontario

Statement of Source and Application of Funds

for the Year Ended December 31, 1971 (with comparative figures for 1970)

Source of Funds

	1971 \$'000	1970 \$'000
Operations		
Depreciation charged		
Directly to operations	80,336	65,290
Indirectly to operations and fixed assets under construction	10,439	9,630
Debt retirement	52,543	47,640
Amortization of frequency standardization cost, less interest on the account	17,916	15,820
Interest — reserve for stabilization of rates and contingencies	15,562	13,688
Provision (withdrawal) — reserve for stabilization of rates and contingencies	(12,064)	7,700
Amortization of discount on bonds and notes payable	3,956	7,389
Sales to retail and direct customers — net deficit	(1,693)	(3,448)
Other items — net	50	726
	<u>167,045</u>	<u>164,435</u>
Proceeds from issues of bonds and notes, less retirements	355,912	366,307
Amounts held in cash and investments — net decrease (increase)	3,781	(25,692)
	<u>359,693</u>	<u>340,615</u>
Increases in accounts and interest payable	31,728	41,348
Other items — net	1,642	155
	<u>560,108</u>	<u>546,553</u>

Application of Funds

Expenditures on fixed assets — net	502,271	504,907
Increases in accounts receivable	45,375	11,134
Increases in fuel, materials, and supplies	12,462	30,512
	<u>560,108</u>	<u>546,553</u>

Notes to financial statements

1. Interchange of Power

Power purchased and sales of secondary energy include amounts arising from interconnection arrangements for the exchange of power with other power production authorities.

2. Nuclear Agreement — Pickering Units 1 and 2

The Commission, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering nuclear generating station. Based on current estimates of final costs of construction, approximately 32% of the final capital cost is to be financed by the Commission, 37% by Atomic Energy of Canada Limited, and 31% by the Province of Ontario, ownership of the units being vested in the Commission. Contributions by Atomic Energy of Canada Limited and the Province of Ontario to December 31, 1971 amount to \$240,382,000 (including \$48,398,000 receivable from the two parties at that date) and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Commencing with the in-service date of each of the units (July 29, 1971 for unit 1 and December 30, 1971 for unit 2) the Commission makes payments for a period of up to 30 years to each of the parties in proportion to their capital contributions. These payments, termed "payback", are calculated in accordance with the agreement and in a broad sense provide for payments of amounts representing the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

3. Interest

Interest costs consisted of:

	1971 \$'000	1970 \$'000
Interest on bonds, notes, and advances	218,589	188,646
Less:		
Interest earned on investments	27,281	28,224
Interest capitalized	52,591	34,300
Interest on unamortized frequency standardization cost	2,408	2,909
Miscellaneous interest	7,206	5,378
	<u>129,103</u>	<u>117,835</u>

4. Depreciation

Effective January 1, 1971 the method of providing depreciation on the Commission's fixed assets (excluding office and service equipment) was revised. Prior to this date the sinking fund method was used. Since January 1, 1971 the method of depreciation was changed so that all future additions to the system and the net book value of thermal generating stations in service at the end of 1970 would be depreciated using the straight line method. All other assets in service (excluding office and service equipment) at the end of 1970 will continue to be depreciated on the sinking fund basis. The straight line method provides better protection against future obsolescence, and this has become a more important factor with the increasing proportion of thermal generating facilities with their shorter operating lives. As a result of the change in method, depreciation charged to operations for 1971 is approximately \$10,600,000 more than it would otherwise have been.

5. Investments

Investments which are included at amortized cost, consisted of:

	1971 \$'000	1970 \$'000
Government and government-guaranteed bonds	257,559	260,578
Corporate bonds	995	995
	<u>258,554</u>	<u>261,573</u>

Market value of these investments at December 31, 1971 was \$254,263,000.

6. Cash and Short-term Investments

Cash and short-term investments, with short-term investments recorded at amortized cost (approximately market value) consisted of:

	1971 \$'000	1970 \$'000
Cash	7,732	7,151
Interest-bearing deposits with banks and trust companies	41,961	82,797
Government and government-guaranteed bonds	67,855	21,605
Corporate obligations	27,000	31,287
Chartered bank notes	5,900	8,610
	<u>150,448</u>	<u>151,450</u>

7. Fuel for Electric Generation

Inventory of fuel consisted of:

	1971 \$'000	1970 \$'000
Coal	73,977	62,377
Nuclear fuel	5,441	6,330
Fuel oil	511	468
	<u>79,929</u>	<u>69,175</u>

8. Bonds Payable

a) The liability for bonds payable consisted of:

	1971 \$'000	1970 \$'000
Bonds payable in		
Canadian Currency		
— Guaranteed by the Province of Ontario	2,265,283	2,014,805
United States Currency		
— Held by the Province of Ontario	1,046,755	999,554
United States Currency		
— Eurodollar Issue		
— Guaranteed by the Province of Ontario	35,295	—
West German Currency		
— Guaranteed by the Province of Ontario	70,846	40,401
Total Bonds payable	<u>3,418,179</u>	<u>3,054,760</u>

b) The liability for bonds payable in foreign currencies is translated to Canadian currency at the rates of exchange at time of conversion. When bonds are retired, exchange losses or gains are recorded in the reserve for stabilization of rates and contingencies. Translated at the rates of exchange which prevailed at December 31, 1971 the total liability for bonds payable in foreign currencies would be decreased by \$28,300,000.

c) Bonds maturing in the next five years, including foreign-currency bonds translated to Canadian currency at the rate of exchange at the time of conversion, are as follows:

	\$'000
1972	65,611
1973	64,772
1974	110,804
1975	80,979
1976	171,617
	<u>493,783</u>

9. Notes Payable

Notes payable consisted of \$210,950,000 maturing in 1972 and \$6,150,000 maturing in 1973.

10. Advances from the Province of Ontario

The final repayment of the Advances from the Province of Ontario amounting to \$701,000 was made during 1971.

11. Contributions from the Province of Ontario as Assistance for Rural Construction

The Province of Ontario contributed \$1,899,000 during 1971 (\$2,112,000 in 1970) as assistance for rural construction.

The Hydro-Electric Power Commission of Ontario

Reserve for Stabilization of Rates and Contingencies

for the Year Ended December 31, 1971

	HELD FOR THE BENEFIT OF ALL CUSTOMERS
	\$ '000
Balances at beginning of year	245,511
Add:	
Interest for the year at rates approximating those earned on investments held for the reserve	15,420
Provision charged to operations	—
Net profit on redemption of bonds payable and sale of investments	3,374
	264,305
Deduct:	
Withdrawal credited to operations	12,064
Withdrawal to offset net deficit on sales to retail and direct customers	—
Grant to Ontario Municipal Electric Association	—
	12,064
Balances at end of year	252,241

Equities Accumulated through Debt Retirement Charges

for the Year Ended December 31, 1971

	MUNICIPALITIES
	\$ '000
Balances at beginning of year	543,063
Add:	
Debt retirement charged to operations	33,975
Equities transferred through annexations	14
Equity refunded on annexation of retail distribution facilities	—
Balances at end of year	577,052

ELD FOR THE BENEFIT OF (OR RECOVERABLE FROM) CERTAIN GROUPS OF CUSTOMERS				TOTALS	
Municipalities	Power District			1971	1970
	All Direct Customers	Direct Customers Former Northern Ontario Properties	Retail Customers		
\$ '000	\$ '000	\$ '000	\$ '000	\$ '000	\$ '000
1,144	(5,602)	7,876	(1,100)	247,829	225,629
68	(350)	493	(69)	15,562	13,688
—	—	—	—	—	7,700
—	—	—	—	3,374	4,323
1,212	(5,952)	8,369	(1,169)	266,765	251,340
—	—	—	—	12,064	—
—	(1,331)	—	3,024	1,693	3,448
68	—	—	—	68	63
68	(1,331)	—	3,024	13,825	3,511
1,144	(4,621)	8,369	(4,193)	252,940	247,829

POWER DISTRICT	TOTALS	
	1971	1970
\$ '000	\$ '000	\$ '000
223,126	766,189	718,699
18,568	52,543	47,640
(14)	—	—
(7)	(7)	(150)
241,673	818,725	766,189

The Hydro-Electric Power Commission of Ontario

Bonds payable in Canadian currency

as at December 31, 1971

Guaranteed as to Principal and Interest by the Province of Ontario

Date of Maturity	Callable on or after	Date of Issue	Interest Rate	Principal Outstanding December 31, 1971
			%	\$
July 5, 1972	—	July 5, 1967	6	14,687,000
Sept. 20, 1972	—	Sept. 20, 1967	6½	11,950,000
Mar. 15, 1973	—	Mar. 15, 1967	5¾	10,809,500
June 15, 1973	June 15, 1971	June 15, 1950	3	53,962,000
Mar. 18, 1974	—	Mar. 18, 1969	7½	20,000,000
July 15, 1974	July 15, 1972	July 15, 1956	4	46,255,500
Oct. 15, 1974	Oct. 15, 1972	Oct. 15, 1956	4½	24,548,500
Dec. 1, 1974	—	Dec. 1, 1969	8½	20,000,000
Aug. 15, 1975	Feb. 15, 1972	Feb. 15, 1957	4¾	32,906,000
Jan. 15, 1976	Jan. 15, 1974	Jan. 15, 1956	4	43,809,500
*Sept. 15, 1976	—	Sept. 15, 1970	8½	75,000,000
Oct. 1, 1976	—	Oct. 1, 1969	8¼	14,050,000
Nov. 15, 1976	Nov. 15, 1974	Nov. 15, 1957	5	34,717,000
Jan. 5, 1977	Jan. 5, 1975	Jan. 5, 1967	6¼	14,960,000
Mar. 1, 1977	Mar. 1, 1975	Mar. 1, 1955	3½	38,448,500
Apr. 1, 1977	Apr. 1, 1974	Apr. 1, 1957	5	74,075,000
Mar. 1, 1978	Mar. 1, 1976	Mar. 1, 1958	4½	32,652,000
Oct. 15, 1978	Oct. 15, 1976	Oct. 15, 1958	5	45,959,500
May 15, 1979	May 15, 1974	May 15, 1954	3½	34,492,000
July 1, 1979	—	July 1, 1959	5¾	28,811,500
Oct. 15, 1979	Oct. 15, 1974	Oct. 15, 1954	3½	49,733,000
Feb. 15, 1980	Feb. 15, 1978	Feb. 15, 1960	6	26,551,000
July 15, 1980	July 15, 1978	July 15, 1960	5½	35,719,000
Feb. 15, 1981	Feb. 15, 1979	Feb. 15, 1961	5½	39,660,000
June 15, 1982	June 15, 1979	June 15, 1962	5	32,458,000
Mar. 1, 1983	Mar. 1, 1980	Mar. 1, 1963	5¼	40,131,500
June 15, 1983	June 15, 1979	June 15, 1963	5	51,691,600
Nov. 15, 1983	Nov. 15, 1980	Nov. 15, 1961	5¼	40,272,000
Feb. 1, 1984	Feb. 1, 1981	Feb. 1, 1964	5¼	50,253,700
Oct. 1, 1984	Oct. 1, 1980	Oct. 1, 1964	5¼	54,103,000
Feb. 1, 1985	Feb. 1, 1981	Feb. 1, 1965	5¼	68,698,500
July 5, 1987	July 5, 1985	July 5, 1967	6¼	24,082,000
Jan. 4, 1988	Jan. 4, 1984	Jan. 4, 1966	5¾	49,269,500
Apr. 15, 1988	Apr. 15, 1984	Apr. 15, 1966	6	47,778,000
July 5, 1988	July 5, 1984	July 5, 1966	6	46,563,000
Jan. 5, 1989	Jan. 5, 1985	Jan. 5, 1967	6¼	38,264,500
Sept. 20, 1989	Sept. 20, 1985	Sept. 20, 1967	6½	27,501,000
Mar. 15, 1990	Mar. 15, 1986	Mar. 15, 1967	6	46,258,000
Apr. 1, 1992	Apr. 1, 1988	Apr. 1, 1968	7	41,495,000
Aug. 15, 1992	Aug. 15, 1988	Aug. 15, 1968	7	48,060,000
Sept. 18, 1992	Sept. 18, 1988	Sept. 18, 1968	7	61,370,000
Mar. 18, 1994	Mar. 18, 1989	Mar. 18, 1969	7¾	29,044,000
Apr. 1, 1994	Apr. 1, 1990	Apr. 1, 1970	9	47,602,000
May 1, 1994	May 1, 1989	May 1, 1969	7¾	32,610,500
Oct. 1, 1994	Oct. 1, 1989	Oct. 1, 1969	8¼	24,186,000
Dec. 1, 1994	Dec. 1, 1989	Dec. 1, 1969	8½	22,065,000

Bonds payable in Canadian currency

as at December 31, 1971 — concluded

Guaranteed as to Principal and Interest by the Province of Ontario

Date of Maturity	Callable on or after	Date of Issue	Interest Rate	Principal Outstanding December 31, 1971
			%	\$
Feb. 1, 1995	Feb. 1, 1990	Feb. 1, 1970	9	50,000,000
June 30, 1995	June 30, 1990	June 30, 1970	9	58,770,000
Nov. 30, 1995	Nov. 30, 1990	Nov. 30, 1970	8¾	74,000,000
Feb. 4, 1996	Feb. 4, 1991	Feb. 4, 1971	7½	100,000,000
Apr. 1, 1996	Apr. 1, 1991	Apr. 1, 1971	7⅝	60,000,000
July 21, 1996	July 21, 1991	July 21, 1971	8¼	75,000,000
Sept. 15, 1996	Sept. 15, 1991	Sept. 15, 1971	7⅞	100,000,000
Total bonds payable in Canadian currency				<u>2,265,283,300</u>

Exchangeable at the option of the bondholder for an equal principal amount of bonds due September 15, 1996 such bonds to bear interest at 8¼ %.

Subject to maturity of any bond on February 1, 1975 if the bondholder so elects.

Bonds payable in United States currency

as at December 31, 1971

Held by the Province of Ontario and having terms identical with issues

sold in the United States by the Province of Ontario on behalf of the Commission

Date of Maturity	Callable on or after	Date of Issue	Interest Rate	Principal Outstanding December 31, 1971	
			%	U.S. \$	CAN. \$
Sept. 1, 1972	Sept. 1, 1956	Sept. 1, 1951	3¼	37,331,000	38,974,368
Feb. 1, 1975	Feb. 1, 1958	Feb. 1, 1953	3¼	44,976,000	44,032,868
Nov. 1, 1978	Nov. 1, 1958	Nov. 1, 1953	3⅝	46,583,000	45,490,870
Mar. 15, 1980	Mar. 15, 1959	Mar. 15, 1954	3⅝	29,337,000	28,629,324
May 15, 1981	May 15, 1961	May 15, 1956	3⅝	41,718,000	40,964,717
Feb. 1, 1984	Feb. 1, 1969	Feb. 1, 1959	4¾	69,821,000	67,697,030
Sept. 15, 1990	Sept. 15, 1975	Sept. 15, 1965	4¾	48,701,000	52,414,443
Apr. 1, 1996	Apr. 1, 1981	Apr. 1, 1966	5½	32,946,000	35,519,908
Apr. 15, 1997	Apr. 15, 1982	Apr. 15, 1967	5⅝	62,144,000	67,251,461
Dec. 1, 1997	Dec. 1, 1982	Dec. 1, 1967	6⅞	71,745,000	77,574,528
Aug. 1, 1998	Aug. 1, 1983	Aug. 1, 1968	7⅞	72,355,000	77,645,964
Feb. 15, 1999	Feb. 15, 1984	Feb. 15, 1969	7⅞	74,855,000	80,422,344
Sept. 1, 1999	Sept. 1, 1984	Sept. 1, 1969	8⅝	98,260,000	105,905,862
Feb. 15, 2000	Feb. 15, 1985	Feb. 15, 1970	9¼	99,545,000	106,762,012
Aug. 1, 2000	Aug. 1, 1985	Aug. 1, 1970	9¼	75,000,000	76,593,750
May 15, 2001	May 15, 1986	May 15, 1971	7.85	100,000,000	100,875,000
Total bonds payable in United States currency — held by the Province of Ontario				<u>1,005,317,000</u>	<u>1,046,754,449</u>

The Hydro-Electric Power Commission of Ontario

Bonds payable in United States currency — Eurodollar Issue

as at December 31, 1971

Guaranteed as to Principal and Interest by the Province of Ontario

Date of Maturity	Callable on or after	Date of Issue	Interest Rate	Principal Outstanding December 31, 1971	
				U.S. \$	CAN. \$
Jan. 15, 1977-1986 (ten equal annual instalments)	Jan. 15, 1977	Jan. 15, 1971	8¼%	<u>35,000,000</u>	<u>35,295,312</u>

Bonds payable in West German currency

as at December 31, 1971

Guaranteed as to Principal and Interest by the Province of Ontario

Date of Maturity	Callable on or after	Date of Issue	Interest Rate	Principal Outstanding December 31, 1971	
				DM	CAN. \$
Aug. 1, 1975-1984 (ten equal annual instalments)	Aug. 1, 1975	Aug. 1, 1969	7%	150,000,000	40,401,005
Dec. 1, 1977-1986 (ten equal annual instalments)	Dec. 1, 1977	Dec. 1, 1971	7½%	100,000,000	30,445,000
Total bonds payable in West German currency				<u>250,000,000</u>	<u>70,846,005</u>

New Resources of Power for the Years Ahead

PICKERING GS

One of the five heavy-water towers
is shown being hoisted into position at the station.



In 1971, the Commission's construction program for new generating resources included two large nuclear-electric developments, Pickering GS and Bruce GS, two conventional thermal-electric stations, Nanticoke GS and Lennox GS, and one hydro-electric station, Lower Notch GS on the Montreal River.

Progress on Power Developments

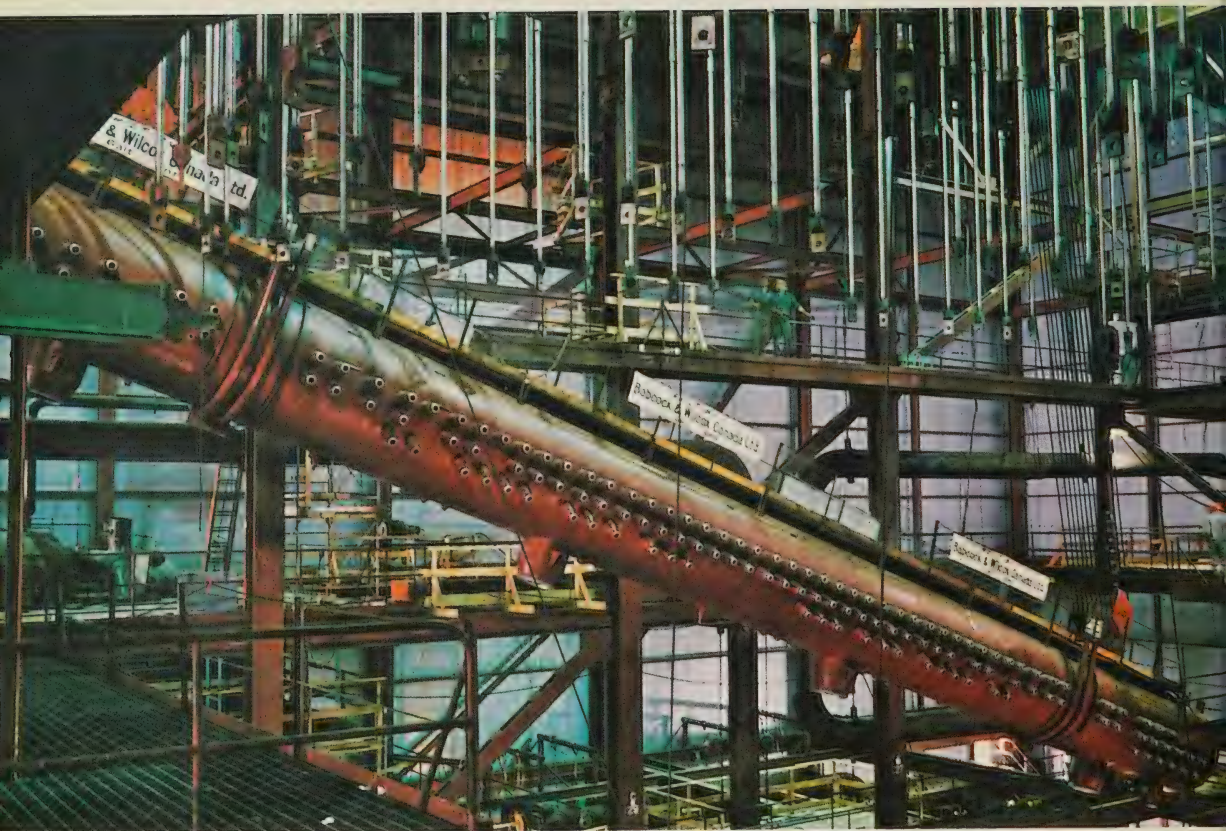
Lower Notch GS was placed in service on November 2, 1971, when the first unit was paralleled with the system. Two of the Pickering GS units were placed in service during the year, one on April 4 and the other on October 6. With these stations already in service, the program as approved at the end of 1971 extends to the autumn of 1978, and includes two further units at Pickering GS, four units at each of Bruce and Lennox Generating Stations, and eight units at Nanticoke GS.

The performance of the two Pickering units proved most gratifying and encouraging for the future of the CANDU nuclear-generating concept. On-power fuelling for Unit 1 was carried out on full load during November and December. The remaining two units are scheduled for service in 1972 and 1973. At the end of the year, commissioning activities on Unit 3 and installation of Unit 4 were well advanced. Construction activity continues in full swing at Bruce GS where four 800-megawatt units will be installed when present plans are complete.

Also at the Bruce Nuclear Development, work is continuing for the construction of the heavy-water plant now nearing completion. This plant, being built for Atomic Energy of Canada Limited, will be operated by Ontario Hydro, beginning in the latter half of 1972. When in full operation, the plant is expected to produce 800 tons of heavy water per year. A substantial part of the output in the early years is intended for use at Bruce GS for the four reactors now scheduled for service in the years 1975 to 1978.

At Nanticoke GS, the first shipment of coal arrived early in July. Though the boiler of one unit was ready for first firing early in August, late delivery of parts for the turbine delayed the in-service date beyond the end of 1971.

The Commission's new Lennox GS is being designed for the use of either crude or residual oil as fuel for the boilers, the cost and availability of fuel, as well as the problem of atmospheric pollution, being major considerations. The boilers, each capable of producing a maximum continuous flow of 3.6 million pounds of steam per hour at 2,500 psig and 1,000/1,000°F, will be of the low-excess-air type. They offer improved combustion efficiency, involve lower maintenance cost, and produce smaller quantities of atmospheric pollutants. The four turbine generators ordered in 1969 from the Canadian General Electric Company Limited will be almost replicas of those installed at Lambton GS, and will provide an estimated dependable peak capacity of 2,060 megawatts. They are scheduled for



NANTICOKE GS ON LAKE ERIE

The steam drum for the second unit to be installed is shown being hoisted into position.

The photograph at the right features the two 650-foot stacks, each of which serves four 500-megawatt units.

The red steel ductwork and equipment in the foreground are for the electrostatic fly-ash precipitators, one of which is shown being installed in the picture on page 29.





NANTICOKE GS

Comparison with the men at work on top of the equipment gives some impression of the size of the large fly-ash precipitators being installed at this 4,000-megawatt station. Specifications for the equipment call for the removal of 99.5 per cent of the particulates from the exhaust gases in the chimneys.

service successively, commencing in late 1974 and running through till the spring of 1977.

The site of Lennox GS near Bath, about 22 miles west of Kingston, has fully confirmed its selection as having excellent geological conformation, convenient access to an adequate supply of cooling water, and satisfactory conditions attending the purchase of the extensive acreage of property required. The station property now encompasses nearly 1,200 acres, and further purchases are being made for the transmission facilities, which will link the station with the present 230-kV network and eventually with the extended 500-kV grid.

At Richard L. Hearn GS, Unit 1 was first fuelled with gas instead of coal on August 13. It was brought on full load on the new fuel two days later. A major step in the program to reduce and control atmospheric pollution was taken at the station when Unit 5 was fired with natural gas for the first time on September 16, and the exhaust was dispersed high above ground level through the new 700-foot stack. When fuel conversion is complete for all eight units, early in 1972, the four 100-megawatt units will burn only gas, and the four 200-megawatt units will burn either gas or coal, or both in combination, the choice being governed by weather and fuel-supply conditions.

In order to meet recent much more stringent regulations governing the sulphur content of the fuel used at Lakeview GS, the Commission plans to convert half of the station to dual firing by either coal or oil, the present assumption being that atmospheric conditions will permit the use of coal for up to 60 per cent of the time without any deleterious effect on the environment. Additional equipment will be installed on the remaining four coal-fired units to improve their ash-control facilities. Improvements of this kind are not made, of course, without some significant increase in the cost of producing power.

Transformer Stations

During 1971, seven new transformer stations were placed in service on the 230-kV network, and four on the 115-kV network. At three 230-kV transformer stations and two new 115-kV stations construction is proceeding. The three 230-kV stations are to serve the interconnection between the Manitoba Hydro and Ontario Hydro systems. The service capacity at five other transformer stations was increased from 115 kV to 230 kV, and additional transformer capacity was installed at five 115-kV stations.

Orders for eight three-phase auto-transformers for the interconnection of the 500-kV and 230-kV networks have been placed with the Canadian General Electric Company Limited and Westinghouse Canada. Rated at 750,000 kVA and weighing close to 350 tons each, these transformers are the heaviest purchased to date by the Commission. The special tank designed for these transformers will permit delivery by rail on cars which incorporate the transformer tank as part of the vehicle itself.



BRUCE GS ON LAKE HURON

Construction activity continues in full swing at Bruce GS, where four 800-megawatt units will be eventually installed. In December 1971, massive structural concrete work was proceeding on schedule.

In the foreground at the right is the vacuum building, in the background the reactor structure for Unit 2, and at the left the central fuelling area.

Transmission Lines

Construction is well under way for a 230-kV transmission interconnection with the Manitoba Hydro System. The first section, a single-circuit, twin-pole line from Atikokan via Fort Frances and Kenora to the interprovincial boundary, is scheduled for completion in April 1972. A second section of similar construction, from Atikokan via Dryden and Kenora to the boundary, is scheduled for completion in April 1973.

A major extension of the 500-kV transmission facilities by approximately 900 circuit miles will be required in southern Ontario between 1974 and 1977 to incorporate the increased total output of new units being brought into service in turn at Pickering, Nanticoke, Lennox, and Bruce Generating Stations. Negotiations are under way for the location of the required rights of way, which are being planned in large part for widths of approximately 600 feet and for the accommodation of three 500-kV single-circuit, and two 230-kV double-circuit lines.



HEAVY-WATER PLANT — BRUCE NUCLEAR DEVELOPMENT

Work is continuing for the construction of the heavy-water plant being built for Atomic Energy of Canada Limited, which is now nearing completion. When in full operation, the heavy-water plant is expected to produce 800 tons of heavy water per year.

With the net addition of 707 circuit miles of transmission line in 1971, there were 21,915 circuit miles in service at the end of the year, including 435 miles at 500 kV, 6,737 miles at 230 kV, and 6,716 miles at 115 kV.

Research

Research activity at the Ontario Hydro W. P. Dobson Research Laboratory is primarily directed towards those areas which are now of critical importance to the advancement of electric power technology.

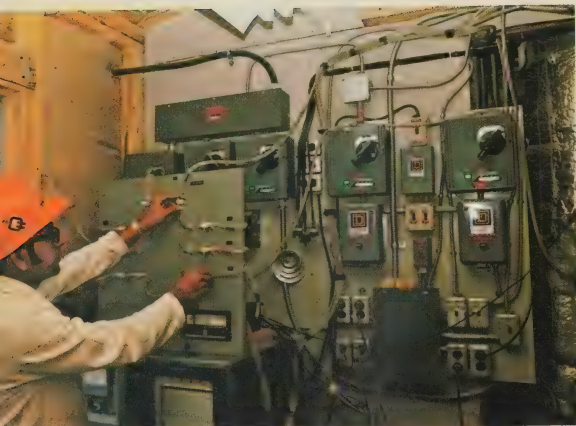
One of these areas is the design and development of high-voltage transmission lines that are more attractive in appearance and sufficiently compact to be accommodated on narrower rights of way. Work in support of this program included laboratory studies of insulators having a semi-conductive glaze. A small leakage current through the glaze significantly increases the flash-over strength of the insulators by keeping them warm and dry in the presence of moisture and contamination. Other transmission line work was directed towards the prevention of galloping in ice-covered conductors, either by the use of a mid-span torsional damper or a span-end damper. Success in field trials of these devices now under way, and in other developments, would permit considerable reduction in tower dimensions as well as in the spacing of conductors. This could lead to the possible acceptance of new tower configurations as now proposed by two firms of industrial designers.

Both laboratory and field tests on a prototype 115-kV vacuum circuit-breaker have established the feasibility of its providing synchronized high-speed fault interruption. The use of the breaker in conjunction with new solid-state protective relay systems now under development should result in faster fault clearing with less disturbance to the power system, and should also permit economies in future system design.

With a view to improving power-system reliability, studies have been carried out for the comparison of outage rates of two switching arrangements for Jones-type transformer stations, for the assessment of the need for on-site replacements for 500-kV transformers, and for the evaluation of the reliability of parallel overhead transmission circuits.

Failure of tubes in power plant heat-exchangers can result from wear and fatigue brought about by flow-induced vibration. At Pickering GS, problems of this type have been overcome by stiffening the vibrating tubes and modifying the fluid flow, but the basic mechanism of the phenomenon is not yet fully understood. Extensive theoretical and experimental studies are being directed towards improving reliability in the design of new equipment.

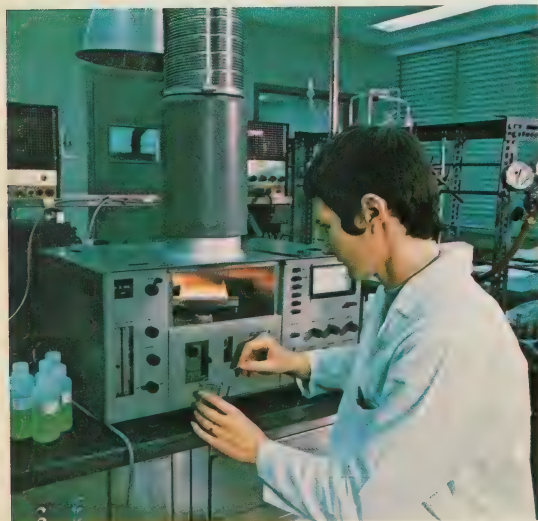
There is evidence of need to improve the standard of quality in thermostats used for the control of room temperature, particularly to restrict the range of temperature fluctuation



DESULPHURIZATION OF FLUE GASES

Following successful operation of a small flue-gas desulphurization scrubber at Richard L. Hearn GS in 1970, a pilot plant capable of scrubbing 4,000 cubic feet of gas per minute was built and operated at Lakeview GS.

This is some of the control equipment inside the hut where the pilot plant is housed.



The flue gas in the scrubbing process is passed through an aqueous slurry of finely ground limestone with which the sulphur dioxide in the gas reacts to form a disposable sludge. The technician is here engaged in an analysis of this sludge.

Following several months of experimental work, the pilot plant was used continuously for 40 days, demonstrating that the process is reliable and capable of removing up to 80 percent of the sulphur dioxide. Preliminary design for a large-scale demonstration plant is now under way.

permitted by their operation. In order to develop a certification program, a full-scale test room was constructed to represent the living room of a brick-veneer bungalow. Equipment was installed to permit the room to be subjected to simulated summer and winter outdoor conditions. In this room the performance of thermostats now used in conjunction with various types of electric heating equipment can be tested and compared with their performance in a standard National Electrical Manufacturers Association test chamber.

In generating stations and other station locations, transistor and rectifier components in solid-state electronic control equipment are subject to failure with more than acceptable frequency as a result of transient voltage surges induced in the station control wiring during the operation of high-voltage switchgear. Major changes in wiring practices have been devised in order to reduce these troublesome conditions, and these are now being incorporated into new stations.

A scanning-type electron microscope recently purchased is facilitating studies of the surface features of a wide variety of materials especially in their natural untreated condition. Its large depth of focus and high magnification permit detection and detailed stereoscopic study of fine cracks, cavities, and deformations, none of which would be possible with conventional optical equipment. Materials examined have included new alloys, products of corrosion, semi-conductive glazes on porcelain insulators, and particulate pollutants.

Computer Services

Computer services are now provided through large-scale, third-generation equipment located at Head Office. Supplementary equipment such as terminals, both high-speed and low-speed, are located at strategic points throughout the province. Special effort is now being directed to providing more direct access to the computers for users, to improving response time generally, and to ensuring the consistency and integrity of the stored data.

The Staff at Work

To meet the normal requirements for employee replacements, as well as the demands of new activities, over 7,700 persons were engaged during the year, 340 to fill management and professional positions, 1,595 for technical and clerical work, and the remainder for more temporary employment primarily on regional or construction projects. The average employee population over the 12-month period was 23,264, of which number, 16,671 were regular employees, and 6,593 temporary employees.

In 1971, approximately 1,200 students were given summer employment. Nearly 300 of these summer employees worked in developmental positions directly related to their fields of study. In addition, 189 university students enrolled in engineering and mathematical studies had work-term assignments with the Commission as part of a co-operative university-industry educational program.

Training and Development

A program for the identification and development of potential senior managers was continued and expanded, and by the end of the year, 175 persons had already availed themselves of the opportunity to participate. A supplementary benefit has been the interest and enlargement of experience found in the exercise by many senior managers, who have participated as observers of the candidates' performance in a simulated management situation.

The Conference and Development Centre, near Orangeville, was in constant productive use during the year to provide apprenticeship and trades training to approximately 3,700 employees, courses in management training to 412, and courses various in content to 1,140 others. In addition, apprenticeship training was given to 283 employees and management training to 84 representatives from 77 municipal electrical utilities.

During the year, eleven visitors from abroad, representatives of nations in the early stages of industrial development, spent time varying from a few days to several months in the Commission's organization receiving training and guidance in power utility operation.

The Work Environment

In the development of its compensation program, the Commission is placing increasing emphasis on total compensation, the concept that payment for work should be seen as embracing not only direct pay but also the major benefits and allowances which an employee receives, and the general conditions under which he works. For that reason, management is continuously examining employee benefits and pay practices in order to respond appropriately to changes in government legislation, and by ensuring the adequacy of its compensation program, to maintain its position as a leading employer in the province. During 1971, considerable effort was spent in keeping employees well informed regarding the benefits they receive from the well-rounded compensation program.



FUEL LOADING AT PICKERING GS

A fuel bundle is being placed in the reactor as part of the initial loading procedure.

On-load fuelling for Unit 1 was carried out on full load during November and December 1971.

In 1971, the former Accident Prevention and Medical Services Divisions were brought together to form the Health and Safety Division. Accident prevention is now appropriately associated with health services and health physics, which are similarly oriented activities directed respectively towards the prevention of disease and the prevention of health hazards.

In addition to the provision of facilities to meet normal first-aid and medical requirements at work locations, special attention has been given to the problems of cardiovascular and respiratory disease, and malignancies. As an outcome of another continuing program for the complete medical assessment of partially disabled employees, many of these employees have been provided with suitable opportunities for productive employment.

As energy production at the large nuclear-electric stations increases, appropriate medical, monitoring, and protective services have been developed and expanded as required to meet the new conditions that apply at these stations.

The over-all frequency rate of disabling injuries per million man-hours worked remained unchanged at 10 in 1971, roughly equivalent to the average over the previous five years. Work in the Regions, on the other hand, was carried out with an accident frequency rate of 5, the lowest so far recorded in the Regions, and the Northwestern Region achieved the distinction of being the first Region to work a complete year without a disabling injury. The severity rate is based on the statistical allocation of a stipulated number of lost hours to specified types of accident. This rate, regrettably affected by five fatal accidents during 1971, was 1,000 as compared with 800 in the previous year, but nevertheless still showed slight improvement over the average for the preceding five years. The motor vehicle accident rate per million miles driven declined from 11 in 1970 to 10 in 1971.

Special security measures are now required to control the growing incidence of theft from Ontario Hydro properties, particularly thefts of copper. Through formal instruction and repeated admonition, the staff is constantly reminded that their vigilance and sense of personal responsibility are the Commission's best protection against unwarranted trespass that might result in damage to equipment or the theft of materials.

Labour Relations

Amendments to the Labour Relations Act as proclaimed in February 1971 provide for the accreditation of employer associations as bargaining agents for management in the construction industry.

The Electrical Power Systems Construction Association (EPSCA) was formed in March 1971, with this legislation in mind, specifically for the purpose of jointly representing management of the Commission's field construction forces and the 180 construction contractor members. Negotiations



PICKERING GS

The massive 540-megawatt Unit 1 at Pickering GS occupies the centre foreground, and Unit 2, with part of the generator housing removed, is in line with it in the background. The group of visitors to the left of the units is by contrast barely visible.

Each of the units extends for 183 feet in this turbine hall, and the hall, in which four units will eventually be housed end to end, will be approximately 1,000 feet in length. At the left, a member of the staff checks operating data in one corner of the large control room.





FREEZING CABLE FOR SPLICING

A combination of 60,000 pounds of dry ice and 450 gallons of alcohol was used to freeze the insulating oil in the 115,000-volt high-pressure underground cable circuits between Charles and Teraulay Transformer Stations in Toronto so that splices for system connection changes could be made.

With oil pressure reduced from 200 psi to 50 psi, the cable was placed in 12-foot aluminum troughs about 100 feet from where a cut was to be made. It was then frozen by reducing the temperature to -30°C . After the splices were complete and the air between the frozen oil plugs had been removed by vacuum to eliminate moisture, the frozen oil was allowed to thaw, and the pipe was refilled with oil.

between EPSCA and the Allied Construction Council, which represents Ontario Hydro's construction workers, have been scheduled for early in 1972 on the assumption that the technicalities now seen as obstacles to accreditation can either be removed by amendment to the present Act, or resolved by joint union-management agreement. The Commission and The Society of Ontario Hydro Professional Engineers and Associates (SOHPEA), in the same way, are continuing informal discussion of items of common interest through the Joint Society-Management Committee.

The agreement effective April 1, 1970 and signed on April 7, 1971 with Local 1000 of the Canadian Union of Public Employees, representing approximately 12,000 trades, technical, and office employees, remains in force until March 31, 1972. During the past year, certain new sections recently added to the agreement seem to have given rise to a substantial increase in the number of grievances. Though the large majority of them were resolved by the parties, two grievances which were of more general interest, as involving the issue of contracting out, went to arbitration and were resolved in the Commission's favour. One covered the use of outside services in meter reading, and the other the engagement of the employees of a supplier.

More than half of the 65 municipal electrical utilities engaged in negotiation during 1971 required conciliation procedures before reaching agreement either with the Canadian Union of Public Employees or with the International Brotherhood of Electrical Workers, and five experienced strikes of varying duration. The number of municipal electrical utilities dealing with certified unions, however, continues to grow, and the utilities in general are turning in larger numbers, and with increasing frequency, to the Commission's Labour Relations staff for guidance and research assistance in their labour relations activity. The outcome has been a more co-ordinated approach to collective bargaining by electrical utilities across the province with regard to issues that are common to all.

The Hydro-Electric Power Commission of Ontario

Pension and Insurance Fund Statement of Assets as at December 31, 1971 (with comparative figures for 1970)

	1971 \$ '000	1970 \$ '000
Investments		
Bonds and stocks —		
Federal and Provincial government and government-guaranteed bonds	146,932	143,931
Corporation bonds	42,103	39,456
Stocks	86,448	73,481
Total bonds and stocks	275,483	256,868
First mortgages on real estate	76,215	52,907
Real property leased to others	349	364
Total investments	352,047	310,139
Cash	320	179
Accrued interest	3,669	2,839
	356,036	313,157
Receivable from (Payable to) The Hydro-Electric Power Commission of Ontario	(196)	3,105
	<u>355,840</u>	<u>316,262</u>

Notes

1. The most recent actuarial valuation of the pension plan was made as at December 31, 1970, in compliance with the requirements of The Pension Benefits Act 1965. This valuation indicated that the plan had an unfunded liability of approximately \$31,900,000. Current contributions have been made on a basis sufficient to meet actuarial requirements, and include an amount sufficient to recover this deficiency within the period of time required by The Pension Benefits Act 1965.
2. In the above statement, bonds are included at amortized cost, stocks at cost, first mortgages on real estate at balance of principal outstanding, and real property at cost less amortization. At December 31, 1971 the par value of Federal and Provincial government and government-guaranteed bonds was \$152,226,000, par value of corporation bonds was \$42,034,000 and the approximate market value of total bonds and stocks was \$265,592,000.

Auditors' report (Pension and Insurance Fund)

We have examined the statement of assets of The Hydro-Electric Power Commission of Ontario Pension and Insurance Fund as at December 31, 1971. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1971.

Toronto, Canada
March 30, 1972

CLARKSON, GORDON & CO.
Chartered Accountants

HUDSON BAY

MANITOBA

ONTARIO

JAMES BAY



Legend

Main Sources of Power

HYDRO-ELECTRIC	Thermal-Electric Conventional	Nuclear	CAPACITY IN KILOWATTS
			over 500,000
			100,000-500,000
			10,000-100,000
			under 10,000

GENERATING STATIONS UNDER CONSTRUCTION

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OR BEING EXTENDED

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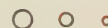
ROUTES OF MAIN POWER FLOW



POINTS OF POWER INTERCHANGE



MAIN UTILIZATION CENTRES



Regions

①	Western	LONDON
②	Niagara	HAMILTON
③	Central	TORONTO
④	Georgian Bay	BARRIE
⑤	Eastern	BELLEVILLE
⑥	Northeastern	NORTH BAY
⑦	Northwestern	THUNDER BAY

REGIONAL BOUNDARIES



The Commission's Organization and Operation

The Hydro-Electric Power Commission of Ontario is a corporate entity, a self-sustaining public enterprise endowed with broad powers with respect to electricity supply throughout the Province of Ontario. Its authority is derived from an Act of the Provincial Legislature passed in 1906 to give effect to recommendations of earlier advisory commissions that the water powers of Ontario should be conserved and developed for the benefit of the people of the Province. It now operates under The Power Commission Act (7-Edward VII, c. 19) passed in 1907 as an amplification of the Act of 1906 and subsequently modified from time to time (Revised Statutes of Ontario, 1970, c. 354). The Commission may have from three to six members, all of whom are appointed by the Lieutenant-Governor in Council. Two Commissioners may be members of the Executive Council of the Province of Ontario.

The Commission is primarily concerned with the provision of electric power by generation or purchase, and its delivery in bulk either for resale for the most part by the 353 municipal electrical utilities now co-operatively associated with the enterprise, or for use by 91 direct, and generally industrial customers, including several mining companies. Most of the direct customers cannot be conveniently served by municipal utilities. This primary aspect of operations accounts for more than 90 per cent of the Commission's energy sales. The remaining sales are made to retail customers either in rural areas or in certain communities not served by municipal electrical utilities. The Commission's retail customers, together with the direct customers, are served through what is known as the Power District. Except for this Power District operation, retail service throughout the province is generally provided by the associated municipal electrical utilities, which are largely owned and operated by local commissions functioning under the general supervision of The Hydro-Electric Power Commission of Ontario as provided for in The Power Commission Act and The Public Utilities Act. Under this legislation, the Commission, in addition to supplying power, is required to exercise certain regulatory functions with respect to the municipal utilities served.

Financial Features

The basic principle governing the financial operations of the Commission and its associated municipal electrical utilities is that service is provided at cost. In the Commission's operations, cost of service includes payment for power purchased, charges for operation, maintenance, and administration, and related fixed charges. The fixed charges represent interest, an allowance for depreciation, and a provision for debt retirement. The municipal utilities operating under cost contracts with the Commission are billed throughout the year at interim rates based on estimates of the cost of service. At the end of the year, when the actual cost of service is established, the necessary balancing adjustments are made in their accounts. Retail rates for the municipal utilities are maintained at levels calculated to produce revenue adequate to meet cost.

The enterprise from its inception has been self-sustaining. The Province, however, guarantees the payment of principal and interest on all bonds issued by the Commission and held by the public. In addition, the Province has materially assisted the development of agriculture by contributing under The Rural Hydro-Electric Distribution Act toward the capital cost of extending rural distribution facilities.

Ontario Hydro's regional offices

Western Region
1075 Wellington Rd. S., London
G. R. Currie, Manager

Niagara Region
Box 157, 1053 Main St. W., Hamilton
W. J. Jackson, Manager

Central Region
5760 Yonge St., Willowdale
F. J. Dobson, Manager

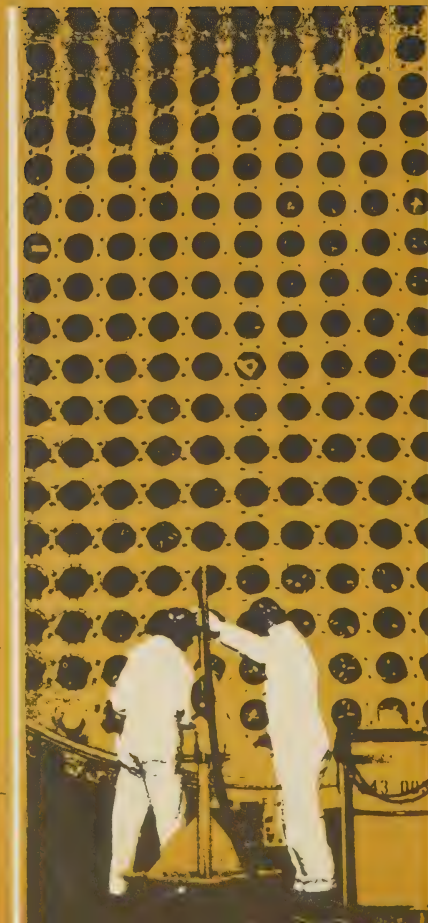
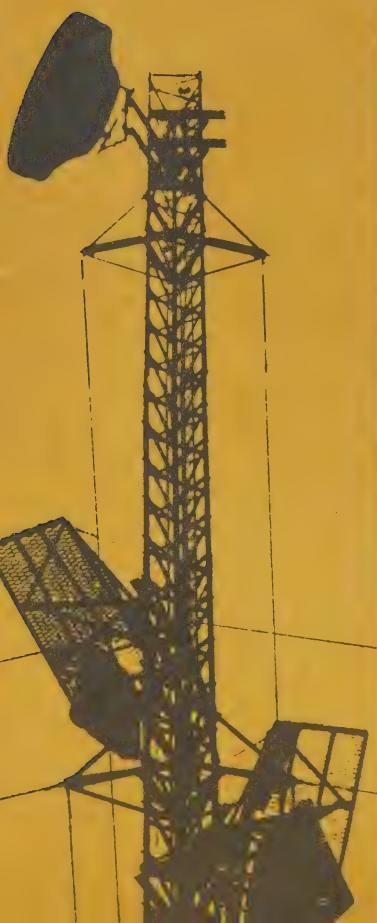
Georgian Bay Region
84 Collier St., Barrie
R. S. Griffin, Manager

Eastern Region
420 Dundas St. E., Belleville
A. M. Pedersen, Manager

Northeastern Region
Box 3060, 590 Graham Drive, North Bay
T. E. Flinn, Manager

Northwestern Region
34 N. Cumberland St.
Postal Station "P", Thunder Bay
K. N. Bodkin, Manager

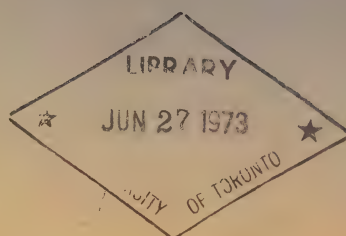
The line photographs on the cover suggest interesting engineering developments at Ontario Hydro, some of which are important items in this Report. Viewed from left to right across the open cover, they include a relay tower of the microwave control system, the reactor face for Unit 1 at Pickering GS, a transformer station representing the pulse of the power-delivery complex, heavy-water towers at Bruce GS as evidence of Ontario Hydro's expanding interest in chemical engineering, and the construction of the second extra-high-voltage line from the James Bay watershed.



Ontario Hydro Annual Report 1972

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Report

George E. Gathercole

200-20-01
- 1973

May 25, 1973

The Honourable W. Ross Macdonald, P.C., C.D., Q.C., LL.D.

Lieutenant-Governor of Ontario

Sir:

I take pleasure in submitting herewith the Annual
Report of The Hydro-Electric Power Commission of Ontario for the
year 1972.

Respectfully submitted,

George E. Gathercole
Chairman

The Commission — 1972

GEORGE E. GATHERCOLE, LL.D., Chairman

D. ARTHUR EVANS, M.P.P., Vice-Chairman

LT. COL. A. A. KENNEDY, D.S.O., E.D., Commissioner

DR. J. D. FLEMING, Commissioner

LOU E. DANIS, Commissioner

ROGER N. SÉGUIN, Q.C., LL.D., Commissioner

E. B. EASSON, Secretary

D. J. GORDON, General Manager

Assistant General Managers

D. B. IRELAND — Regions and Marketing

M. NASTICH — Finance

O. S. RUSSELL — Personnel

H. J. SISSONS, M.B.E. — Services

H. A. SMITH, M.B.E., F.R.S.C. — Chief Engineer

Notes from the Chairman's office

Ontario Hydro's record of service in 1972, despite some trials, was one of notable accomplishment, marked in particular by the continued outstanding performance of the nuclear-electric Pickering GS.

Production of primary energy increased by 7.9 per cent over that in 1971 to 73,497 million kilowatt-hours. Consumption by our large industrial customers, however, was essentially the same as in 1971.

A sharp rise of 59 per cent in sales of secondary energy to 6,500 million kilowatt-hours was due mainly to increased exports to the United States. These sales of surplus energy served to improve our financial position.

Revenue from all sources rose 11.5 per cent to \$702.2 million, while assets increased 9 per cent to \$5,525 million.

During the year the third 540,000-kilowatt nuclear-electric unit was commissioned at Pickering GS, bringing our total system dependable peak capacity to 14.4 million kilowatts.

Although not fully commissioned, the first 500,000-kilowatt unit at the coal-fired Nanticoke GS also began operation. Construction proceeded on additional capacity of 9.6 million kilowatts, all of which is slated for operation progressively in the period 1973 to 1978.

Despite a four-month strike involving 12,000 employees, electrical service was virtually uninterrupted throughout the province. Ironically enough, some people saw our successful performance in the face of this adversity as evidence that Hydro must be over-staffed. They overlooked the long

hours worked by those who remained on the job, the vacations foregone, the family life disrupted, and the many essential tasks deferred while engineering and service personnel were diverted to the critical job of keeping the system operating. Relative to the growth in our production capacity, the increase in our regular staff has been small. Whereas in 1961 we had one staff member for each 600 kilowatts of capacity, we now have one member only for each 900 kilowatts, and we expect this trend to continue.

As a result of opposition to a vitally needed corridor for bulk transmission between Nanticoke GS and Pickering GS, Ontario Hydro experienced in 1972 difficulties and delays similar to those being encountered by many other public and private enterprises in establishing their facilities. This matter was referred to the Solandt Commission for review, and an independent consultant was subsequently appointed to conduct a further study.

A great deal of time and effort is now being devoted to developing and implementing an open-planning procedure which will give citizens a more effective voice in the selection of power facility location. We are providing for earlier participation by individuals—including not only the property owners concerned but also environmentalists, ecologists, and conservationists — and for a more intensive analysis of alternative courses of action. It is hoped that through greater public participation the construction of facilities will be more widely accepted, and that decisions will be reached in time to avoid critical delays in their progress to completion. If we fail to provide in time for essential future needs, the consequences in consumer distress, industrial dislocation, and the loss of jobs through our inability to support industrial expansion could be extremely serious.

PICKERING GS

Although it was shut down for over four months in 1972, the station produced 5,738 million kWh during the year, equivalent to 8.3 per cent of the total energy generated by Ontario Hydro in 1972.

In the photograph below, the Chairman addresses the audience at the official opening of the station. The platform guests include Premier William G. Davis and interested Government officials, as well as representatives of Ontario Hydro and Atomic Energy of Canada Limited.





Task Force Hydro, which was appointed by the Government in 1971 to review Hydro's function, structure, operation, financing, and objectives, issued its first report towards the end of the year. Additional reports are scheduled for publication during 1973. The initial report gave high praise to Ontario Hydro for its past achievements and contributions to the well-being of the province, and made a number of recommendations which would improve its capability to deal effectively with changing requirements in the future. A pivotal recommendation is that Hydro be changed from a commission to a crown corporation. A number of organizational changes will be made as a result of the Task Force studies.

The vital role of Hydro's nuclear-power program in meeting the future energy needs of Ontario — a province rich in reserves of uranium but deficient in fossil fuels — was underscored in 1972 by the emerging energy crisis in the United States and the report of the Ontario Advisory Committee on Energy, which was issued early in 1973.

For the moment our nuclear program is being inhibited by a shortage of heavy water, which has resulted in some temporary interruptions in the operation of Canadian nuclear stations. Once the shortage has been overcome — in part by Atomic Energy of Canada's Bruce Heavy Water Plant, which Ontario Hydro is now commissioning, and eventually by the development of additional heavy-water production capacity — our nuclear program will move ahead on a large scale. In 1972 nuclear-electric stations produced nearly 9 per cent of the electric energy generated in our system despite the fact that Pickering GS was shut down during the strike. By 1990 they may produce from 60 to 70 per cent.



BRUCE HEAVY WATER PLANT

Construction workers leave the site at the end of a shift. This plant, owned by Atomic Energy of Canada Limited and scheduled for commissioning in 1973, is designed to produce 800 megagrams of heavy water (about 880 short tons) per year at 100 per cent capacity.

A continuing cause of concern during 1972 as in recent years was the impact of inflation. We are making every effort to offset rising costs and to minimize increases in our electricity rates, but we can claim no exemption from the inflationary pressures of high interest rates and the rising costs of fuel, equipment, property, and labour. Annual rate increases appear inevitable for the next several years to offset these effects of inflation, to provide for increasing expenditures on environmental programs, and to ensure adequate funds for our expanding construction program.

We are confident, however, that our rates will remain fully competitive with those in other jurisdictions and with those of other forms of energy. All indications are that electricity will continue to be called upon to play an expanding role in meeting Ontario's energy requirements and in contributing to the health of the economy and to the environmental quality that most people desire.

I wish to thank my fellow Commissioners and the management and staff of Ontario Hydro for their dedication in fulfilling our growing commitments and, on their behalf, to record our appreciation of the close collaboration of the Ontario Municipal Electric Association, the Association of Municipal Electrical Utilities, and the 353 utilities which they represent in our joint responsibility of continuing to provide a high standard of electrical service to the citizens of Ontario.

Requirements for power and service

On December 4, 1972, the primary peak demand of the Commission's customers reached a new maximum of 12,738,976 kW to register a 10.4 per cent increase over the 1971 peak. At no time in the past has the annual maximum occurred so early in December.

The dependable peak capacity of the Commission's resources at 14,422,200 kW, though only 3.5 per cent greater than in 1971, was quite adequate to meet primary requirements. For system security reasons, however, advantage was taken of the opportunity under interruptible power contracts to reduce the East System component of the peak load by 98,400 kW. The increase in dependable peak capacity for the most part represents the availability of a third nuclear-electric unit and two combustion-turbine units at Pickering GS.

Primary energy demands for the year rose by 7.9 per cent to reach 73,497 million kWh. In total 79,994 million kWh were generated and purchased during the year, 37,617 million kWh being generated in the Commission's hydro-electric stations, 31,749 million kWh in its thermal-electric stations, and 10,628 million kWh being purchased. While production exceeded the 1971 level by 10.8 per cent, hydro-electric and thermal-electric production were higher by 8.0 per cent and 12.2 per cent respectively, the increase in hydro-electric production being largely attributable to improved stream

flows. A 2.5 per cent increase was recorded in the output of conventional thermal-electric stations, but nuclear-electric production, amounting to 5,794 million kWh, was almost double that of 1971. A 16.9 per cent increase in the amount of purchased energy is largely attributable to new contracts negotiated with Hydro-Quebec and Manitoba Hydro.

The changing pattern in energy production is, of course, reflected in fuel consumption—a decrease of 11.2 per cent in coal consumption to 8,377,200 tons, an increase in natural gas consumption to 37,259 million cubic feet, and a 54.8 per cent decrease in fuel oil used by combustion-turbine units to 5,492,500 gallons. Nuclear units at Pickering GS required 142.9 megagrams (157 short tons) of uranium in 1972, as compared with 66.2 megagrams (73 short tons) in 1971.

Upon completion of a remarkably brief commissioning period following its initial operation on May 3, Unit 3 at Pickering GS was placed in service on June 1. Shortly after the OHEU began strike action towards the end of June, the Commission deemed it advisable to shut down all three operating units at this station, until late October for Units 1 and 2, and until early November for Unit 3. Unit 2 at Nanticoke GS, which had been undergoing commissioning tests since it was first operated on January 16, 1972, was also shut down during the summer, and commissioning tests were resumed between October 11 and the end of the year.

Because of the greatly increased total operation at Pickering GS during the year it was necessary to transfer supplies of heavy water from Douglas Point and the Nuclear Power Demonstration Plant on April 3 and April 14 respectively, and these two units as a consequence were unavailable for service until late in the year. At Richard L. Hearn GS, the one unit remaining of the eight being changed over to operation on natural gas in 1971 was first operated on this fuel early in March.





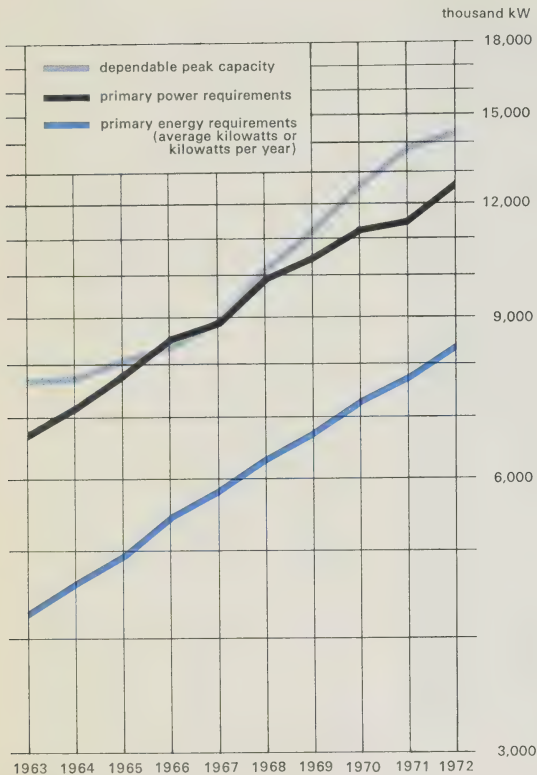
New methods being studied for the transmission of large blocks of power include a ducted three-phase air-medium system for direct burial underground. Here a length of tubing representative of a phase conductor is being adjusted in position over a ground plane for power-frequency voltage tests of the dielectric strength of the air gap.

Under new agreements negotiated with Manitoba Hydro, up to 200,000 kW of firm power will be made available in a series of steps between April 1, 1972 and March 31, 1978. The capacity of the 230-kV equipment at Beauharnois GS was raised to meet the requirements of additional energy deliveries from Hydro-Quebec, which began on June 1 in accordance with the contract dated October 2, 1970. A new interconnection agreement between Hydro-Quebec and Ontario Hydro was ratified on June 1, 1972. It provides for mutual assistance in emergencies, and for the exchange of various classes of power apart from those specified for delivery under the earlier contract.

Of several short-term agreements negotiated in 1972 for the delivery of power between Ontario Hydro and utilities in Michigan and New York, only one remained in effect at the end of the year, that for the delivery of 300,000 kW of diversity power by Michigan utilities to Ontario Hydro.

Output at DeCew Falls was virtually eliminated, and the capacity of the system was consequently reduced when diversion from the Welland Canal was curtailed on December 18 as part of the canal relocation, which will not be completed before March 1973. In conformity with a Ministry of the Environment request, flow during the work period will be re-established at approximately 200 cfs. During the winter, storage for the stations will be retained in the headpond area for emergency requirements.

Growth in demands and resources 1963-1972



NOTE ON THE RATIO SCALE

This diagram and its counterpart on the opposite page, which together deal in a complementary way with demands and resources, have a ratio or proportional scale for their vertical dimension rather than the more conventional arithmetic scale.

The interest in the data plotted for the three basic variables is not in the arithmetic quantities themselves but in the comparative rates of growth which they reveal. When plotted on a ratio scale, a specific change in rate of growth will produce the same change in the slope of the curve regardless of position on the scale. When plotted on an arithmetic scale, the slope of a given rate of change would grow increasingly steep as the plotting moves up the scale. Visual comparison of rates of change at different levels is much more convenient on the ratio scale.

With unseasonably cold weather in the spring, freshet conditions in southern Ontario were delayed until late April, and were disappointing in duration. Normal precipitation throughout most of the year thereafter, however, resulted in generally favourable storage conditions, though lake levels in some parts of the Northwestern Region were still below normal at the end of the year. Flow into Lake Ontario in November and December was substantially in excess of that experienced over the previous 110 years. Annual mean flows of the Niagara, St. Lawrence, and Ottawa rivers were all in the range of 20 per cent above the 10-year moving averages, the corresponding flow of the Abitibi River being about 16 per cent below the average.

System maintenance

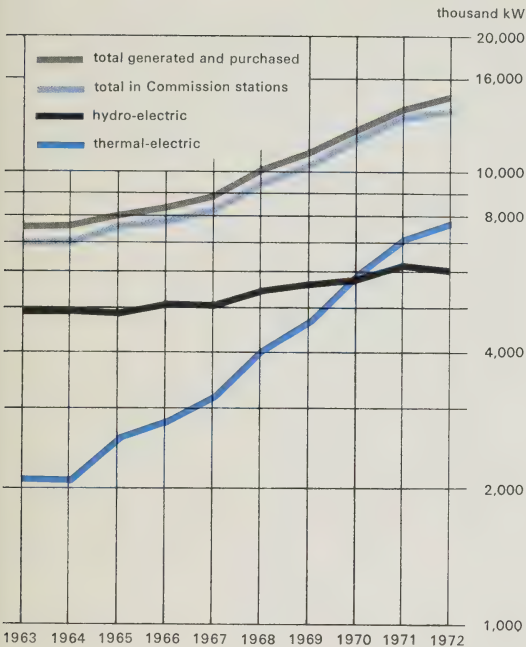
System maintenance practices are being continuously improved with the purpose of minimizing any possible detriment to the natural environment. For example, the greatly expanded use of helicopters in line rehabilitation reduces the need for access by vehicles over cultivated land. A number of self-supporting towers recently purchased for use as replacement structures on the 230-kV system are designed for helicopter erection. Techniques are being developed for determining in advance a qualitative and quantitative assessment of the visual aspects of proposed transmission line corridors.

The development of low-growing, deep-rooted, perennial ground cover on part of the dike at the Sir Adam Beck-Niagara Pumping Generating Station is illustrative of new techniques being generally introduced in landscape improvement.

Supply

Fuel requirements, expressed in terms of equivalent quantities of coal, increased by 8 per cent in 1972. In the year nuclear fuels replaced the equivalent of 2 million tons of coal.

Dependable peak capacity of resources



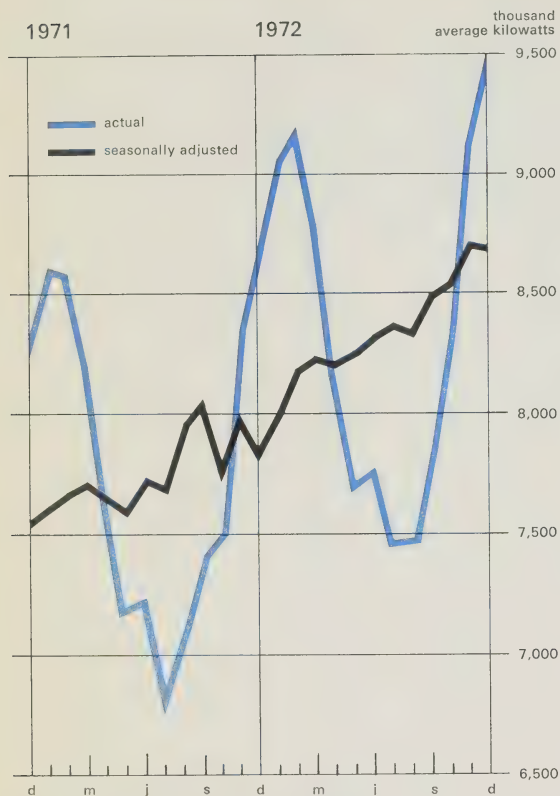
Future supply of fuels was enhanced by contracts negotiated for supplying oil at Lennox GS beginning in 1974-75 and an agreement with a major coal producer for opening a new coal mine in 1976. Comprehensive studies are continuing in search of future sources of fuels including coal, gas, oil, and uranium.

During 1972, suppliers provided materials, equipment, and services costing over \$417 million. Unfilled orders, placed in 1972 and earlier, had a total value of \$867 million at the end of the year.

When commissioned late in 1973, the new warehouse at the Ontario Hydro Service Centre will replace older in-efficient buildings which have been in use since 1948. The new warehouse, covering three acres, incorporates electronically guided material-handling equipment. The facility is designed to provide expeditious overnight delivery of standard materials, and is planned to permit expansion to meet foreseeable needs to 1990.

A prototype fly-ash processing plant at Lakeview GS is now in operation, after being taken over and completed by the Commission in 1972. The plant is designed to convert 200,000 tons of fly ash annually into light-weight aggregate, pozzolan, and iron powder for marketing to the building industry, thereby reducing substantially both environmental problems and costs for disposing of fly ash in the Metro Toronto area.

Primary energy demands (1971-1972)




ENERGY DEMAND SEASONALLY ADJUSTED

By the application of appropriate statistical factors to the raw data on energy use month by month, it is possible to eliminate the regularly recurring seasonal pattern of load fluctuation so that the prevailing direction of periodic change, and the effect of significant but other than seasonal variables are more clearly apparent.

In 1972 the seasonally adjusted demand moved upward at a fairly constant rate through the first three quarters of the year.

In the last quarter there was little evidence of the irregularity caused in 1971 by unseasonably high temperatures, but there was a distinct upward shift in the rate of growth, which reflected an underlying economic improvement.



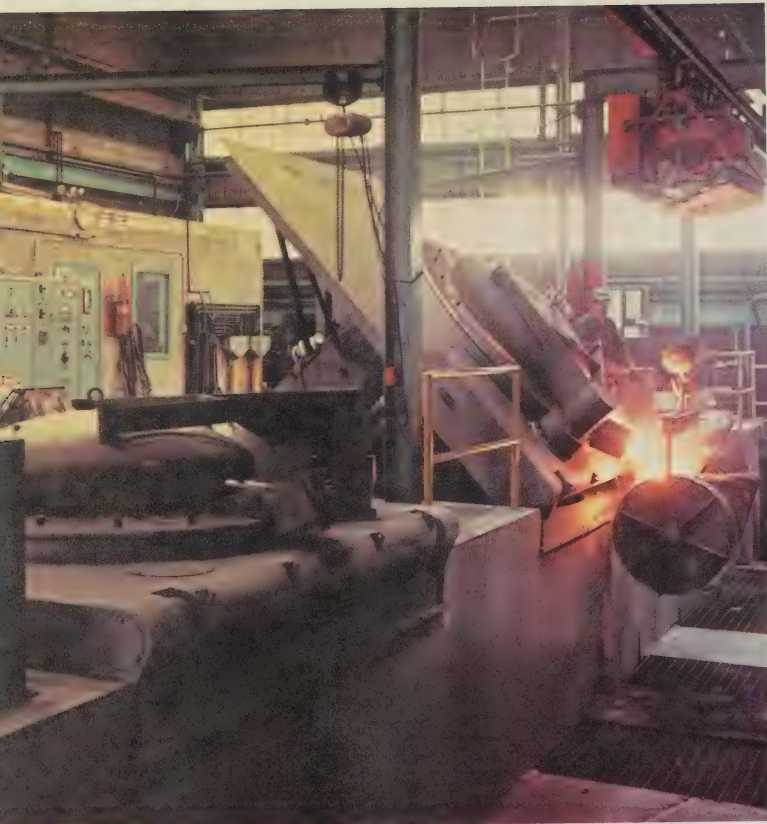
Customer and public relations

During 1972 power was supplied under cost contracts to 353 municipal electrical utilities for resale to approximately 2,000,000 retail customers. Through its own retail distribution system, the Commission also provided electrical service to some 700,000 customers, for the most part located outside the areas served by municipal utilities, including 80 large industrial customers supplied under special contracts.

There were renewed efforts during the year to extend facilities, and in some instances to provide diesel-electric generation, for the supply of power to isolated localities and remote communities. Preparatory work for some of these projects requires extensive negotiation with several parties concerned, and is therefore often time-consuming.

Throughout the year, although hampered by an 18-week labour strike, the Commission continued to emphasize the provision and maintenance of reliable service to customers. During the year extensions of service in northern Ontario were necessarily curtailed as a result of the discontinuance of the Government's assistance toward the capital cost of rural distribution facilities.

MAINTENANCE OF THE ENVIRONMENT
This 51-storey residential and commercial building in Toronto incorporates equipment which reclaims exhaust heat from the building to raise the temperature of incoming air for ventilation. By requiring only about 50 per cent of the energy normally used for this purpose, the all-electric building makes a notable contribution to maintenance of the environment.



ELECTRIC INDUCTION FURNACES
Three Inductotherm coreless induction furnaces, each with a power requirement of 1,000 kW, are part of an all-electric installation at a Brantford foundry.

There were two noteworthy increases in power supplied to primary industries during the year. In the Northeastern Region, an ore-processing plant brought into service during the year requires 60,000 kW of electric power. A second mining company in the Region placed in service a new mill which required 20,000 kW of electric power while operating at 60 per cent of capacity. In the Northwestern Region, a new mine brought into production by this same mining company in 1972 required 7,000 kW of power, with some increase expected when production reaches capacity.

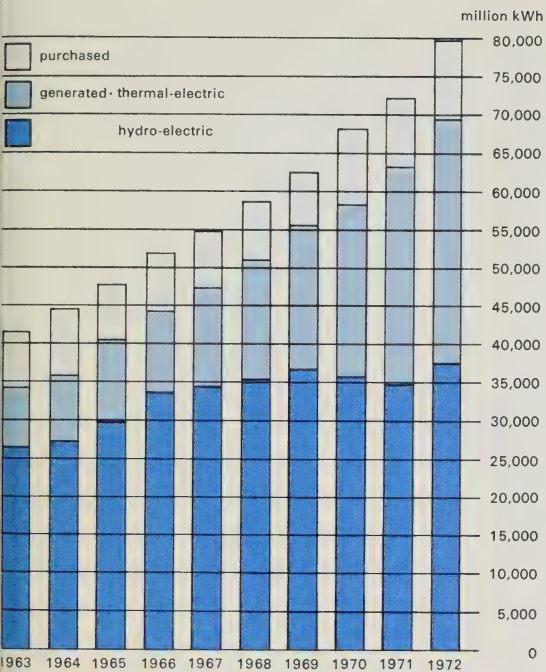
The Commission continues to administer Provincial regulations governing the sale and installation of electrical equipment. In the interests of safety, all electrical installations and the distribution of electrical appliances are subject to its inspection and approval. A revision of the Ontario Electrical Code is scheduled for publication in mid 1973. In order to curb an undesirable increase in the sale of unapproved appliances, stricter supervision is being given to manufacturers and distributors.

Marketing

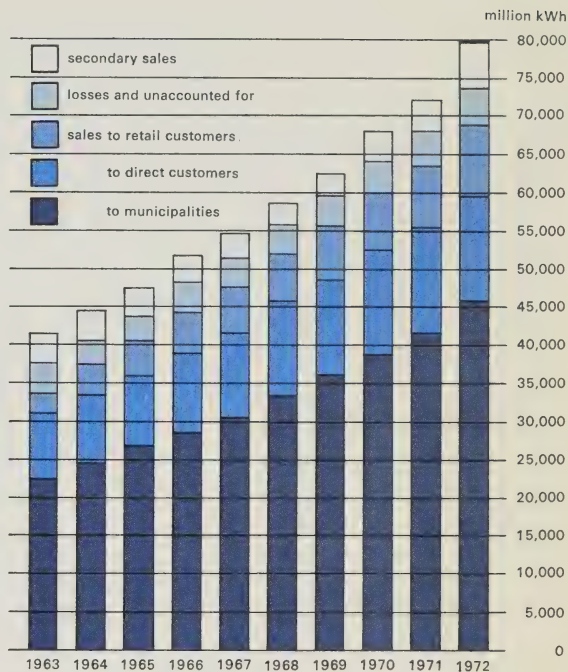
By providing energy in a clean and highly flexible form, electrical service can contribute significantly to the preservation and improvement of the environment. The Commission's marketing program is therefore directed primarily towards the encouragement of those applications which will further economic and environmental ends, whether these applications are for residential, agricultural, commercial, or industrial service. A secondary but still important concern is to ensure the continued efficient, economical, and well-balanced operation of the entire power system.

Under this policy, the emphasis of the associated advertising program is not to promote expansion in the use of electricity for its own sake, but rather to inform people of the services available to them, and to point out the advantages that electric energy has to offer. This service is essential if people

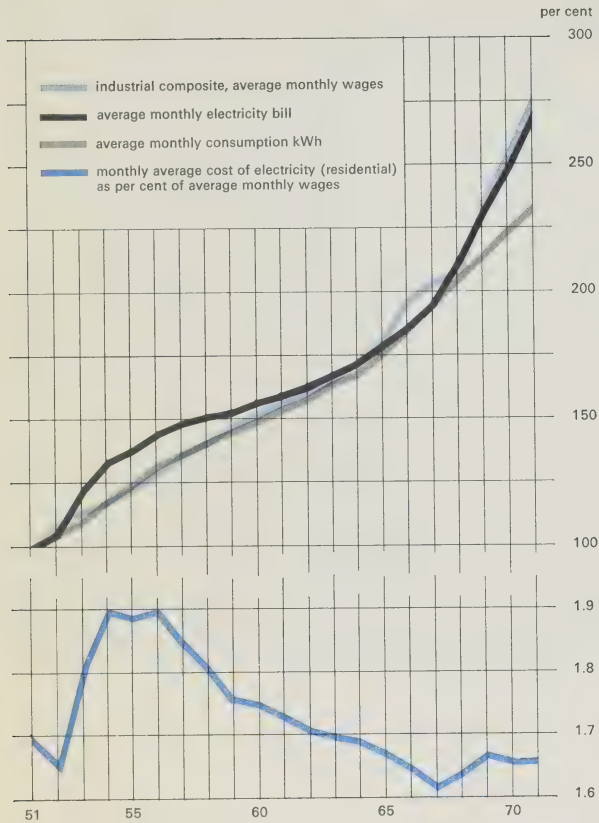
Energy made available



Disposal of energy



Cost of residential electrical service in relation to average income (1951 = 100%)



Recently the average monthly cost for residential electrical service has been rising more rapidly than the average consumption per customer, which of course results in an increase in the average cost per kilowatt-hour. On the other hand there has been a fairly constant relationship between the index of this average monthly cost and the index of rising levels of income (Ontario industrial composite).

Analysis of this relationship over a twenty-year period indicates that the average monthly bill for residential electrical service has not significantly exceeded 1.9 per cent of average monthly income. In 1971 it had fallen well below 1.7 per cent. Yet the service provided in terms of kilowatt-hours consumed has more than doubled over the twenty-year period.

are to make a well-informed choice in a market where strongly persuasive claims are being made by competing energy suppliers.

For residential service, central space-conditioning systems, which combine heating and cooling with air purification and humidity control, obviously have a strong customer appeal. There is, therefore, a continuing need to work in harmony with heating and air-conditioning contractors, and to stress the importance of their role in maintaining high standards of workmanship and service so that customers are assured of satisfaction in this promising market. Particular emphasis was placed during 1972 on the quality and performance of electric-heating systems through the application of the Canadian Standards Association's *Planning Guide for Residential Heating* which has been adopted and published by the Ontario Electrical League as a requirement for Medallion certification. During the year over 20,000 electrically heated dwellings were added to the system, and more than 2,000 dwellings were changed over to electric heat from other types of fuel service.

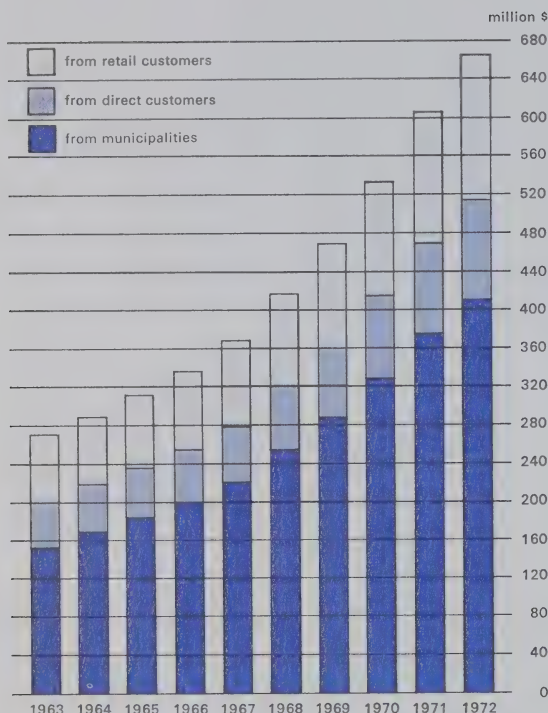
The same emphasis on improvement in the environment, particularly in large urban centres, has encouraged the construction of all-electric, completely space-conditioned, high-rise offices and residential towers. A number of applications of environment conditioning are also important in poultry and dairy farming, and in other major processing industries where safety, economy, and particularly flexibility and precision in control, are prime considerations. Electric-induction melting and holding furnaces in foundry applications offer advantages with regard to pollution control, costs, and working conditions for employees. With the current rapidly increasing demand for castings in Ontario, there are indications that within the next ten years requirements for induction and arc furnaces in foundry operations may reach 1,000,000 kilowatts.

Financial review

Revenues in 1972 were 11.5 per cent greater than in 1971, rising by \$72.5 million. Sales of primary power and energy increased by \$58.1 million or 9.6 per cent and sales of secondary energy rose by \$14.4 million or 62.9 per cent. A combination of increases in rates and increases in demands for power and energy accounted for the additional revenue. Revenue increased \$46.0 million or 12.3 per cent from municipalities, \$12.6 million or 9.1 per cent from retail customers, and decreased \$.5 million or .5 per cent from direct customers.

Costs, before provision for the stabilization of rates and contingencies reserve, rose from \$627.9 million in 1971 to \$710.8 million in 1972. Operation, maintenance, and administration expense increased by \$19.1 million. The cost of fuel used in the generation of electric power exceeded the corresponding cost in 1971 by \$11.2 million, reflecting not only increases in the price of fuel, but also the increasing dependence on thermal-electric generating facilities to meet the growth in customer requirements. Because of the increase in borrowings in total and the effect of high interest rates, interest expense rose by \$29.8 million. Depreciation increased \$13.1 million over the 1971 amount reflecting the continued growth of fixed assets in service. Expenditures on fixed assets during the year amounted to \$562.1 million, including \$394.1 million on thermal-electric generating facilities, \$103.7 million on transformer stations and transmission lines, and \$33.1 million on retail distribution facilities.

Revenues from sales of primary power and energy



Expenditures on thermal-electric generating facilities included \$122.2 million on Nanticoke GS, \$153.6 million on Bruce GS, \$63.9 million on Pickering GS and \$45.3 million on Lennox GS.

The Commission's bonds payable amounted to \$3,862.2 million at December 31, 1972 as compared with \$3,418.2 million at December 31, 1971, for a net increase of \$440.0 million. During 1972 the Commission issued bonds amounting to \$300.0 million in Canadian currency, \$200.0 million (\$198.6 million Canadian) in U.S. currency, DM 100.0 million (\$30.8 million Canadian) in West German currency and SwFr 100.0 million (\$25.9 million Canadian) in Swiss currency.

The balance in the reserve for stabilization of rates and contingencies amounted to \$249.2 million at the end of 1972, down \$3.7 million from the balance at the end of 1971. The reserve is used to stabilize the effects on cost brought about by variations in stream flows, loads varying from the levels forecast, major physical damage to plant and equipment or their premature retirement, fluctuations in exchange on debt payable in foreign currencies, and other contingencies.

Auditors' report

We have examined the balance sheet of The Hydro-Electric Power Commission of Ontario as at December 31, 1972 and the statements of operations, source and application of funds, reserve for stabilization of rates and contingencies, and equities accumulated through debt retirement charges for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the Commission as at December 31, 1972 and the results of its operations and the source and application of its funds for the year then ended.

Toronto, Canada,
April 10, 1973.

CLARKSON, GORDON & CO.
Chartered Accountants

The Hydro-Electric Power Commission of Ontario

Statement of Operations

for the year ended December 31, 1972

	1972 \$'000	1971 \$'000
Revenues		
Primary power and energy	664,834	606,749
Secondary energy (note 2)	37,387	22,940
	<u>702,221</u>	<u>629,689</u>
Costs		
Operation, maintenance, and administration	218,738	199,604
Fuel used for electric generation	123,573	112,369
Power purchased (note 2)	26,810	31,369
Nuclear agreement — payback (note 3)	8,212	2,236
Interest (note 4)	158,905	129,103
Depreciation (note 5)	93,488	80,336
Debt retirement	58,177	52,543
Amortization of frequency standardization	22,927	20,324
Total before reserve provisions and withdrawals	<u>710,830</u>	<u>627,884</u>
Provisions and withdrawals — reserve for stabilization of rates and contingencies:		
Interest added to the reserve	15,690	15,562
Withdrawal — all customers	(16,241)	(12,064)
Withdrawal to offset net deficit on sales to retail and direct customers	(8,058)	(1,693)
	<u>(8,609)</u>	<u>1,805</u>
	<u>702,221</u>	<u>629,689</u>

See accompanying notes on page 25

The Hydro-Electric Power Commission of Ontario

Balance Sheet

as at December 31, 1972

Assets

Fixed assets

Fixed assets in service, at cost (note 3)

Less accumulated depreciation

Fixed assets under construction, at cost

Investments (note 6)

Current assets

Cash and short-term investments (note 7)

Accounts receivable

Fuel for electric generation, at cost

Materials and supplies, at cost

Deferred charges and other assets

Frequency standardization cost, less amounts written off

Debt discount and expense, less amounts written off

Long-term accounts receivable

Other assets

1972	1971
\$'000	\$'000
4,751,604	4,286,294
848,781	762,071
3,902,823	3,524,223
852,093	776,097
4,754,916	4,300,320
261,671	258,554
175,378	150,448
108,320	138,487
105,127	79,929
31,530	29,496
420,355	398,360
27,665	48,896
42,604	37,378
9,446	10,071
8,029	10,147
87,744	106,492
5,524,686	5,063,726

On behalf of the Commission

George Gathenole

Chairman

W.B. Basson

Secretary

Debt, Equity, and Liabilities

Long-term debt

	1972 \$'000	1971 \$'000
Bonds payable (note 8)	3,862,252	3,418,179
Less payable within one year	59,875	65,611
	<u>3,802,377</u>	<u>3,352,568</u>

Equity

Equities accumulated through debt retirement charges	876,900	818,725
Reserve for stabilization of rates and contingencies	249,186	252,940
Contributions from the Province of Ontario as assistance for rural construction ..	126,695	126,695
	<u>1,252,781</u>	<u>1,198,360</u>

Current liabilities

Accounts payable and accrued charges	168,565	147,507
Notes payable	150,650	217,100
Accrued interest	79,563	71,786
Long-term debt payable within one year	59,875	65,611
	<u>458,653</u>	<u>502,004</u>

Deferred liabilities

Customers' deposits	2,773	2,874
Workmen's compensation claims	8,102	7,920
	<u>10,875</u>	<u>10,794</u>
	<u>5,524,686</u>	<u>5,063,726</u>

See accompanying notes on page 25

The Hydro-Electric Power Commission of Ontario

Reserve for Stabilization of Rates and Contingencies for the year ended December 31, 1972

HELD FOR
THE BENEFIT
OF ALL
CUSTOMERS

	\$'000
Balances at beginning of year	252,241
Add:	
Interest for the year at rates approximating those earned on investments held for the reserve	15,647
Net profit on redemption of bonds payable and sale of investments	4,925
	272,813
Deduct:	
Withdrawal credited to operations	16,241
Withdrawal to offset net deficit on sales to retail and direct customers	—
Grant to Ontario Municipal Electric Association	—
	16,241
Balances at end of year	256,572

Equities Accumulated through Debt Retirement Charges for the year ended December 31, 1972

MUNICIPALITIES

	\$'000
Balances at beginning of year	577,052
Add:	
Debt retirement charged to operations	37,990
Equities transferred through annexations	3
Equities refunded on annexation of retail distribution facilities	—
Balances at end of year	615,045

HELD FOR THE BENEFIT OF (OR RECOVERABLE FROM) CERTAIN GROUPS OF CUSTOMERS				TOTALS	
Municipalities	Power District				
	All Direct Customers	Direct Customers Former Northern Ontario Properties	Retail Customers	<u>1972</u>	<u>1971</u>
\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1,144	(4,621)	8,369	(4,193)	252,940	247,829
70	(280)	508	(255)	15,690	15,562
—	—	—	—	4,925	3,374
1,214	(4,901)	8,877	(4,448)	273,555	266,765
—	—	—	—	16,241	12,064
—	2,127	—	5,931	8,058	1,693
70	—	—	—	70	68
70	2,127	—	5,931	24,369	13,825
1,144	(7,028)	8,877	(10,379)	249,186	252,940

POWER DISTRICT	TOTALS	
	<u>1972</u>	<u>1971</u>
\$'000	\$'000	\$'000
241,673	818,725	766,189
20,187	58,177	52,543
(3)	—	—
(2)	(2)	(7)
261,855	876,900	818,725

See accompanying notes on page 25

The Hydro-Electric Power Commission of Ontario

Statement of Source and Application of Funds

for the year ended December 31, 1972

	1972 \$'000	1971 \$'000
Source of funds		
Operations		
Depreciation, including charges indirectly to operations and fixed assets under construction	104,577	90,775
Debt retirement	58,177	52,543
Amortization of frequency standardization cost, less interest on the account	21,231	17,916
Amortization of discount on bonds and notes payable	4,198	3,956
Net amounts added to (withdrawn from) the reserve for stabilization of rates and contingencies	(8,609)	1,805
	<u>179,574</u>	<u>166,995</u>
Proceeds from issues of bonds and notes, less retirements	373,103	355,912
Amounts held in cash and investments — (increase) decrease	(26,709)	3,781
	<u>346,394</u>	<u>359,693</u>
Decrease (Increase) in accounts receivable	30,792	(45,375)
Increases in accounts and interest payable	28,835	31,728
Other items — net	812	1,692
	<u>586,407</u>	<u>514,733</u>
Application of funds		
Expenditures on fixed assets — net	559,175	502,271
Increases in fuel, materials, and supplies	27,232	12,462
	<u>586,407</u>	<u>514,733</u>

See accompanying notes on page 25

Notes to financial statements

1. Changes in financial statement presentation

The financial statements at December 31, 1972 reflect a number of changes in presentation and grouping of items. Details of these changes are listed below. The 1971 figures have been adjusted to a comparable basis.

Statement of operations

—The revenue from sales of primary energy, shown by class of customer in prior years, is shown in one amount as "primary power and energy".
—Sales of secondary energy, formerly shown as a reduction of costs, are now included in revenues as "secondary energy".

Balance sheet

—Investments were previously shown as being held for specific funds, and are now shown as one amount titled "Investments".
—Bonds and notes payable have been classified into long-term and current portions, with current maturities included in current liabilities. In previous years, all debt was classified under one heading as "Debt from Borrowings", with current maturities set out in the notes to the financial statements.
—The "Employer's liability insurance fund" has been renamed "Workmen's compensation claims".

2. Interchange of power

Power purchased and sales of secondary energy include amounts arising from interconnection arrangements for the exchange of power with other power production authorities.

3. Nuclear agreement — Pickering Units 1 and 2

The Commission, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering nuclear generating station, with ownership of these units being vested in the Commission. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amount to \$231,331,000 and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Commencing with the in-service date of each of the units (July 29, 1971 for unit 1 and December 30, 1971 for unit 2) the Commission makes payments for a period of up to 30 years to each of the parties in proportion to their capital contributions. These payments, termed "payback", are calculated in accordance with the agreement and in a broad sense provide for payments of amounts representing the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2. The parties' contributions to the capital cost and their share of "payback" for the years 1971 and 1972 will be adjusted on determination of the final costs of construction of Pickering units 1 and 2, and on adjustment of certain other items affecting the payback calculation which have been provided for on an estimated basis to date.

4. Interest

Interest costs consisted of:

	1972	1971
	\$'000	\$'000
Interest on bonds and notes	249,744	218,589
Less:		
Interest earned on investments	27,314	27,281
Interest capitalized	50,970	52,591
Interest on unamortized frequency standardization cost	1,696	2,408
Miscellaneous interest	10,859	7,206
	<u>158,905</u>	<u>129,103</u>

5. Depreciation

Since January 1, 1971 all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund basis as previously employed.

6. Investments

Investments which are included at amortized cost, consisted of:

	1972	1971
	\$'000	\$'000
Government and government-guaranteed bonds	247,676	257,559
Corporate bonds and notes	13,995	995
	<u>261,671</u>	<u>258,554</u>

Market value of these investments at December 31, 1972 was \$249,284,000.

7. Cash and short-term investments

Cash and short-term investments, with short-term investments recorded at cost (approximately market value) consisted of:

	1972	1971
	\$'000	\$'000
Cash	5,803	7,732
Notes of, and interest-bearing deposits with, banks and trust companies	126,886	47,861
Government and government-guaranteed bonds	27,689	67,855
Corporate bonds and notes	15,000	27,000
	<u>175,378</u>	<u>150,448</u>

8. Bonds payable

a) The liability for bonds payable consisted of:

	1972	1971
	\$'000	\$'000
Bonds payable in		
Canadian currency		
— guaranteed by the Province of Ontario	2,502,110	2,265,283
United States currency		
— held by the Province of Ontario	1,197,306	1,046,755
United States currency		
— Eurodollar Issue		
— guaranteed by the Province of Ontario	35,295	35,295
West German currency		
— guaranteed by the Province of Ontario	101,629	70,846
Swiss currency		
— guaranteed by the Province of Ontario	25,912	—
Total bonds payable	<u>3,862,252</u>	<u>3,418,179</u>

b) The liability for bonds payable in foreign currencies is translated to Canadian currency at the rates of exchange at time of conversion. When bonds are retired, exchange losses or gains are recorded in the reserve for stabilization of rates and contingencies. Translated at the rates of exchange which prevailed at December 31, 1972 the total liability for bonds payable in foreign currencies would be decreased by \$37,800,000. This decrease would have been approximately \$13,000,000 at April 9, 1973 following world currency revaluations.

c) Bonds maturing in the next five years are as follows:

	\$'000
1973	59,875
1974	108,863
1975	78,360
1976	171,617
1977	137,513
	<u>556,228</u>

9. Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, benefit-based plan covering all regular employees of the Commission. The most recent actuarial valuation of the plan, at December 31, 1970, indicated an unfunded liability of approximately \$32,000,000.

The pension costs for each year include current service costs and the amount required to amortize the unfunded liability within the period of time required by The Pension Benefits Act 1965.

The Hydro-Electric Power Commission of Ontario

Bonds payable in Canadian currency as at December 31, 1972

Guaranteed as to principal and interest by the Province of Ontario

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>
			%	\$
Mar. 15, 1973	—	Mar. 15, 1967	5¾	8,667,500
June 15, 1973	June 15, 1971	June 15, 1950	3	51,207,500
Mar. 18, 1974	—	Mar. 18, 1969	7½	19,877,000
July 15, 1974	July 15, 1972	July 15, 1956	4	45,491,000
Oct. 15, 1974	Oct. 15, 1972	Oct. 15, 1956	4½	23,761,000
Dec. 1, 1974	—	Dec. 1, 1969	8½	19,734,000
Aug. 15, 1975	Feb. 15, 1972	Feb. 15, 1957	4¾	32,906,000
Jan. 15, 1976	Jan. 15, 1974	Jan. 15, 1956	4	43,809,500
*Sept. 15, 1976	—	Sept. 15, 1970	8½	75,000,000
Oct. 1, 1976	—	Oct. 1, 1969	8¼	14,050,000
Nov. 15, 1976	Nov. 15, 1974	Nov. 15, 1957	5	34,717,000
Jan. 5, 1977	Jan. 5, 1975	Jan. 5, 1967	6¼	14,910,000
Mar. 1, 1977	Mar. 1, 1975	Mar. 1, 1955	3½	38,113,500
Apr. 1, 1977	Apr. 1, 1974	Apr. 1, 1957	5	73,875,000
Feb. 1, 1978	—	Feb. 1, 1972	6¼	30,000,000
Mar. 1, 1978	Mar. 1, 1976	Mar. 1, 1958	4½	32,652,000
Oct. 15, 1978	Oct. 15, 1976	Oct. 15, 1958	5	45,709,500
May 15, 1979	May 15, 1974	May 15, 1954	3½	34,492,000
July 1, 1979	—	July 1, 1959	5¾	28,811,500
Oct. 15, 1979	Oct. 15, 1974	Oct. 15, 1954	3½	49,352,000
Feb. 15, 1980	Feb. 15, 1978	Feb. 15, 1960	6	26,551,000
July 15, 1980	July 15, 1978	July 15, 1960	5½	35,719,000
Feb. 15, 1981	Feb. 15, 1979	Feb. 15, 1961	5½	39,355,000
June 15, 1982	June 15, 1979	June 15, 1962	5	32,119,000
Mar. 1, 1983	Mar. 1, 1980	Mar. 1, 1963	5¼	39,481,500
June 15, 1983	June 15, 1979	June 15, 1963	5	51,577,300
Nov. 15, 1983	Nov. 15, 1980	Nov. 15, 1961	5¼	39,916,500
Feb. 1, 1984	Feb. 1, 1981	Feb. 1, 1964	5¼	50,128,300
Oct. 1, 1984	Oct. 1, 1980	Oct. 1, 1964	5¼	53,980,000
Feb. 1, 1985	Feb. 1, 1981	Feb. 1, 1965	5¼	67,846,500
July 5, 1987	July 5, 1985	July 5, 1967	6¼	24,017,000
Jan. 4, 1988	Jan. 4, 1984	Jan. 4, 1966	5¾	48,444,500
Apr. 15, 1988	Apr. 15, 1984	Apr. 15, 1966	6	47,067,500
July 5, 1988	July 5, 1984	July 5, 1966	6	44,448,500
Jan. 5, 1989	Jan. 5, 1985	Jan. 5, 1967	6¼	38,110,000
Sept. 20, 1989	Sept. 20, 1985	Sept. 20, 1967	6½	27,451,000
Mar. 15, 1990	Mar. 15, 1986	Mar. 15, 1967	6	45,393,000
Apr. 1, 1992	Apr. 1, 1988	Apr. 1, 1968	7	40,020,000
Aug. 15, 1992	Aug. 15, 1988	Aug. 15, 1968	7	43,930,000
Sept. 18, 1992	Sept. 18, 1988	Sept. 18, 1968	7	56,894,000
Mar. 18, 1994	Mar. 18, 1989	Mar. 18, 1969	7¾	28,494,000
Apr. 1, 1994	Apr. 1, 1990	Apr. 1, 1970	9	47,541,000
May 1, 1994	May 1, 1989	May 1, 1969	7¾	31,960,500
Oct. 1, 1994	Oct. 1, 1989	Oct. 1, 1969	8¼	24,186,000
Dec. 1, 1994	Dec. 1, 1989	Dec. 1, 1969	8½	21,700,000
**Feb. 1, 1995	Feb. 1, 1990	Feb. 1, 1970	9	50,000,000
June 30, 1995	June 30, 1990	June 30, 1970	9	58,220,000
Nov. 30, 1995	Nov. 30, 1990	Nov. 30, 1970	8¾	72,300,000
Feb. 4, 1996	Feb. 4, 1991	Feb. 4, 1971	7½	95,101,000

Bonds payable in Canadian currency as at December 31, 1972 — concluded

Guaranteed as to principal and interest by the Province of Ontario

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>
			<u>%</u>	<u>\$</u>
Apr. 1, 1996	Apr. 1, 1991	Apr. 1, 1971	7%	58,984,000
July 21, 1996	July 21, 1991	July 21, 1971	8¼	74,600,000
Sept. 15, 1996	Sept. 15, 1991	Sept. 15, 1971	7%	99,437,500
Feb. 1, 1997	Feb. 1, 1992	Feb. 1, 1972	7%	70,000,000
Apr. 5, 1997	Apr. 5, 1992	Apr. 5, 1972	7%	100,000,000
Sept. 15, 1997	Sept. 15, 1992	Sept. 15, 1972	8¼	100,000,000
Total bonds payable in Canadian currency				<u>2,502,109,600</u>

*Exchangeable at the option of the bondholder for an equal principal amount of bonds due September 15, 1996 such bonds to bear interest at 8¼%.

*Subject to maturity of any bond on February 1, 1975 if the bondholder so elects.

Bonds payable in United States currency as at December 31, 1972

Held by the Province of Ontario and having terms identical with issues sold in the United States
by the Province of Ontario on behalf of the Commission

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>	
			<u>%</u>	<u>U.S. \$</u>	<u>CAN. \$</u>
Feb. 1, 1975	Feb. 1, 1958	Feb. 1, 1953	3¼	42,301,000	41,413,963
Nov. 1, 1978	Nov. 1, 1958	Nov. 1, 1953	3%	46,147,000	45,065,089
Mar. 15, 1980	Mar. 15, 1959	Mar. 15, 1954	3½	29,302,000	28,595,168
May 15, 1981	May 15, 1961	May 15, 1956	3%	40,973,000	40,233,169
Feb. 1, 1984	Feb. 1, 1969	Feb. 1, 1959	4%	68,972,000	66,873,857
Sept. 15, 1990	Sept. 15, 1975	Sept. 15, 1965	4%	48,100,000	51,767,617
Apr. 1, 1996	Apr. 1, 1981	Apr. 1, 1966	5½	32,616,000	35,164,127
Apr. 15, 1997	Apr. 15, 1982	Apr. 15, 1967	5%	61,844,000	66,926,805
Dec. 1, 1997	Dec. 1, 1982	Dec. 1, 1967	6%	71,395,000	77,196,090
Aug. 1, 1998	Aug. 1, 1983	Aug. 1, 1968	7%	72,025,000	77,291,833
Feb. 15, 1999	Feb. 15, 1984	Feb. 15, 1969	7%	74,480,000	80,019,453
Sept. 1, 1999	Sept. 1, 1984	Sept. 1, 1969	8%	97,635,000	105,232,229
Feb. 15, 2000	Feb. 15, 1985	Feb. 15, 1970	9¼	99,220,000	106,413,449
Aug. 1, 2000	Aug. 1, 1985	Aug. 1, 1970	9¼	74,015,000	75,587,819
May 15, 2001	May 15, 1986	May 15, 1971	7.85	100,000,000	100,875,000
May 15, 2002	May 15, 1987	May 15, 1972	7.70	100,000,000	99,000,000
Dec. 15, 2002	Dec. 15, 1987	Dec. 15, 1972	7.30	100,000,000	99,650,000
Total bonds payable in United States currency—held by the Province of Ontario				<u>1,159,025,000</u>	<u>1,197,305,668</u>

The Hydro-Electric Power Commission of Ontario

Bonds payable in United States currency — Eurodollar Issue as at December 31, 1972

Guaranteed as to principal and interest by the Province of Ontario

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>	
				<u>U.S. \$</u>	<u>CAN. \$</u>
Jan. 15, 1977-1986 (ten equal annual instalments)	Jan. 15, 1977	Jan. 15, 1971	8½%	<u>35,000,000</u>	<u>35,295,312</u>

Bonds payable in West German currency as at December 31, 1972

Guaranteed as to principal and interest by the Province of Ontario

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>	
				<u>DM</u>	<u>CAN. \$</u>
Aug. 1, 1975-1984 (ten equal annual instalments)	Aug. 1, 1975	Aug. 1, 1969	7%	150,000,000	40,401,005
Dec. 1, 1977-1986 (ten equal annual instalments)	Dec. 1, 1977	Dec. 1, 1971	7½%	100,000,000	30,445,000
June 1, 1980-1987 (eight equal annual instalments)	June 1, 1980	June 1, 1972	6½%	100,000,000	30,782,993
Total bonds payable in West German currency				<u>350,000,000</u>	<u>101,628,998</u>

Bonds payable in Swiss currency as at December 31, 1972

Guaranteed as to principal and interest by the Province of Ontario

<u>Date of Maturity</u>	<u>Callable on or after</u>	<u>Date of Issue</u>	<u>Interest Rate</u>	<u>Principal Outstanding December 31, 1972</u>	
				<u>Sw Fr</u>	<u>CAN. \$</u>
*Oct. 2, 1983-1987	Oct. 2, 1983	Oct. 2, 1972	5½%	<u>100,000,000</u>	<u>25,912,024</u>

*In each of the four years ending October 2, 1983 - 1986 Ontario Hydro has undertaken to redeem up to 10,000,000 Swiss francs of bonds by purchase in the market, to the extent that this is practicable, at prices not exceeding the par value of the bonds.

Planning and developing resources for the future

The principal construction activity for the development of new generating resources was carried out in 1972 at Bruce GS, Pickering GS, Nanticoke GS, and Lennox GS, the first two being major nuclear-electric stations, and the others conventional thermal-electric stations.

Progress on power developments

At Bruce GS the major part of civil design work is complete, and work at present is directed towards mechanical and electrical design. Manufacture of most of the major equipment is under way.

During 1972, construction progressed to the point where the installation of electrical and mechanical equipment for Unit 2 was under way in a completely enclosed section of the powerhouse. Civil work for the intake tunnel and for Units 1, 3, and 4 was begun.

The commissioning of Pickering GS continued with remarkable smoothness in 1972, and Unit 3 was accepted for service on June 1, seven months in advance of the scheduled date and only 38 days after the nuclear reactor first went critical. At the end of the year the fourth unit was undergoing commissioning tests.

Operation of the station was discontinued from late in June until after the conclusion of the OHEU strike in late October, but the down-time was used to carry out the manufacturer's survey of the Unit 1 turbine-generator, and to correct defects as well as make minor modifications. All three units were returned to service by mid November.

The on-site plant for bringing the quality of spilt heavy water up to an acceptable grade level was completed in June, and subsequently successfully tested.

At Richard L. Hearn GS, conversion of the last of eight units for the use of



**BRUCE GS ON LAKE HURON —
VACUUM BUILDING**

The first 800,000-kW unit at Bruce GS is scheduled for commercial service in 1976, and the remaining three units are scheduled to follow at yearly intervals.

natural gas was completed, and the unit was initially operated with this fuel on March 10. With a continuing requirement for coal by four units at the station, extensive reinforcing and remedial work was necessary on the coal-receiving dock. This was completed in mid November.

Unit 2 at Nanticoke GS, though not fully commissioned, provided energy to the system for most of 1972.

Though there will be some delay in achieving first steam for Units 1 and 3, there is as yet no indication that commissioning dates now scheduled for these units must be revised. The powerhouse and service bays for the first six units are fully enclosed in heated structures. Structural steel is being erected for the remaining two units.

The necessary civil engineering for the pumphouses supplying Units 5 to 8 was nearly finished, and construction of the four-flue stack serving these units was almost complete. The systems for coal handling and ash disposal were in service, and approximately 300,000 tons of coal had been received before the close of shipping for the year.

At Lennox GS the major emphasis in 1972 was on civil engineering, and on construction of related facilities. Highway No. 33 was relocated and improved, and access to the powerhouse area from the main CNR line was established. The first section of the cooling-water intake pipe, which is 20.5 feet in diameter, was laid in June. In compliance with stringent requirements for the disposal of overburden dredged in preparation for this installation, a special silt retention enclosure was established in the disposal area. Concrete foundation work was carried on throughout the year, and by June structural steel for the service bay of the powerhouse was being erected. By the end of the year the concrete shell of the chimney for Units 1 and 2 had reached its full height, and work on the steel liner had begun. The turbine block for Unit 2 was approaching completion by the end of the year. Manufacture of major items of equipment for delivery in 1973 is proceeding on schedule. Though the OHEU strike caused some delay in design and drawing activity, every effort is being directed to regaining the lost time. During 1972, approval was given for the construction of Arnprior GS on the

Madawaska River, which will bring to completion the optimum development of the river through an integrated series of peak-power generating stations. Acres Consulting Services Limited has been retained to provide engineering and project management services for the construction of a two-unit station, tentatively designed for a total capacity of 87,000 kilowatts. Construction will begin in 1973.

System planning

The Commission's agreement with Hydro-Quebec for the purchase of power and energy over a six-year period commencing in June 1971 was amended early in 1972 to provide for the purchase of additional power and energy between June 1, 1973 and May 31, 1977, and for the conversion to firm energy of the interruptible energy scheduled for this four-year period under the original contract. The agreement now provides for the delivery of 800,000 kilowatts of firm power in the first year and 1,000,000 kilowatts in the period 1974 to 1977, and for delivery of 6,300 million kilowatt-hours of firm energy in 1973-1974 and 7,900 million kilowatt-hours in each 12-month period thereafter for a total of 30,000 million kilowatt-hours. The purchase of the additional firm power and energy is a major contributing factor in providing adequate reserves for the system.

The total cost to Ontario Hydro over the six-year period, assuming the deliveries as planned and taking into account the 7,500 million kilowatt-hours of interruptible energy scheduled for the first two years of the original contract, is estimated to be \$193 million. The average cost per kilowatt-hour for this energy would then be 5.1 mills.

In addition the Commission continues to receive 187,000 kilowatts of firm power from Hydro-Quebec at 75 per cent weekly load factor under the

Beauharnois contract, which will continue in force until November 1, 1976.

Remote control

Control facilities now in service at Muskoka TS permit control of six small Muskoka District generating stations, thus eliminating the need to engage staff at these stations. Design work and related studies are under way for providing supervisory control facilities also at several major hydro-electric stations.

Transformer stations

The first installation in Canada of miniaturized high-voltage metalclad switchgear using sulphurhexafluoride gas as an insulant is scheduled for service at Ontario Hydro's Toronto-Central TS in the spring of 1976. Though this will be one of the largest single 115-kV installations of its kind, the area required for the station site will be significantly smaller than that required if conventional equipment had been installed.

In view of the marked advances in the capabilities of air-blast circuit-breakers, and the projected future short-circuit levels on the system, orders have been placed for the supply of twenty-three 500-kV air-blast circuit-breakers having ratings of 4,000 amperes, ultimate interrupting ratings of up to 75,000 amperes (rms symmetrical), and an interrupting time of two cycles.

With the objective of enhancing station appearance, new switchyard designs have been developed which permit considerable reduction in the height of 500-kV, 230-kV, and dual-element stations. This is achieved by the adoption of solid-steel structures and the elimination of the strain bus.

BRUCE GS ON LAKE HURON

A reactor vessel is manoeuvred into position for unloading, following its 800-mile journey by barge from Montreal. It was subsequently transported for installation at the station site over the railway specially constructed for such operations.



At Essa TS work is under way to tap the 500-kV line from Pinard TS to Kleinburg TS, and at Kleinburg TS itself additional 500/230-kV capacity is being installed. The 230-kV network was expanded during the year by the placing in service of five new transformer stations — Atikokan TS, Cherrywood TS, Fort Frances TS, Kenora TS, and London-Clarke TS. Additional 230/115-kV autotransformer capacity was installed at Toronto-Leaside TS. Work is proceeding for the construction of four new 230-kV stations, for the installation of additional capacity at three 230-kV stations, and for a change in voltage from 115 kV to 230 kV as well as increases in capacity at Buttonville TS, Smiths Falls TS, and Waubesa TS. On the 115-kV network capacity was added in 1972 at five stations. Construction is under way for four new 115-kV stations and for increases in capacity at four other stations.

The capacity of the interconnection with the Detroit Edison Company from J. Clark Keith GS will be doubled when work under way is complete for a voltage change from 115 to 230 kV.

Data acquisition and computer system

Early in April 1972, approval was given to a project for the design and implementation of a data acquisition and computer system (DACS), which gives promise of contributing significantly to the operation and control of an ever increasingly complex power network. This system will contribute to improved efficiency and operation, and more appropriate planning of the system, as well as to the optimization of schedules, and the achievement of greater security in operation. As a security measure it will predict conditions so that lapses in system performance can be anticipated, it will more effectively monitor conditions so that security lapses can be detected when they do occur, and on these occasions it will provide the required control so that the faulty operation can be more promptly corrected.

Data from about 130 transformer and generating stations in Ontario will be gathered and processed by large computers at the Richview System Control Centre, where the data will be displayed in colour as on a television screen, thus providing power dispatchers with greatly enhanced capability to supervise and control the bulk power system. The DACS project is scheduled for service late in 1974.

Transmission and distribution

The final selection of the route for the high-voltage line between Middleport and Oshawa will be made only after further public hearings, and the completion in mid 1973 of a report by the consultant at present engaged in conducting a study of the environmental effects of the project. Over three years of negotiation and discussion with planning boards and councils of municipalities had led in March 1972 to acceptance of a proposed route by eight of eleven municipalities between Newmarket and Middleport likely to be affected. Following the announcement of the new Pickering airport site, a revision to part of the proposed route was required. In June 1972, since opposition to the project persisted, Dr. O. M. Solandt was appointed by the Provincial Government under The Public Enquiries Act to conduct public hearings on the route location. His interim report of October 31, 1972 corroborated Ontario Hydro's need for the facility proposed, but recommended that a consultant be engaged to review the suggested route to ensure that the location finally selected will have the least possible adverse effect on the environment.

In view of this experience the Commission is now retaining a consultant to carry out a similar study of the Lennox GS to Oshawa section, and to report also in mid 1973.

An environmental study now under way for 500-kV right-of-way requirements from Bruce GS to the Georgetown area is being conducted by Ontario Hydro staff. Here again in response to the Solandt enquiry, revisions in procedures have been adopted for this and all similar major projects. A team which is representative of all Divisions within Ontario Hydro concerned with the undertaking is responsible for engaging public participation, and for integrating all activities contributing to the environmental study.

On March 30, 1972, power at 230 kV was supplied for the first time to points west of Thunder Bay over a line extending to Kenora TS via Atikokan and Fort Frances. Between these last two points the line crosses Rainy Lake, where there are four special crossing towers, each 350 feet in height, the longest conductor span being well over one-half mile in length. On September 15, an extension a further 38 miles to the Manitoba border was placed in service to provide the first 230-kV tie-line with Manitoba Hydro.

A second 230-kV interconnection with Manitoba Hydro extending west from Atikokan TS via Dryden will be ready for service in the spring of 1973.

The twinning of locks of the St. Lawrence Seaway Authority in Welland required extensive relocation of transmission lines. Four double-circuit high-voltage crossings were built for operation at 230 kV. Four circuits of 27.6-kV cable and one distribution cable were installed across the canal.

New buildings

Late in 1972 approval was given for the construction of a new Head Office building at the corner of College Street and University Avenue. The new building, when it is complete in



ANTICOCOE GS
 is 46-foot-long steel end-piece is part of an intake which
 1,760 feet long.
 the end of 1972 both intakes at the site were complete,
 including the forebay and the channel through which the Ministry
 the Environment will provide for the water requirements
 several municipalities in the vicinity.

1975, is planned to provide accommodation which for the first time in many years will be more than adequate for the entire Head Office staff now housed in six widely separated locations. The structure will be financed, built, and maintained by Canada Square Corporation. The Commission is to provide the site, which it already owns, and has entered into an agreement with Canada Square Corporation to rent the building under a lease-purchase agreement, which will give the Commission outright ownership of the building after a period of 30 years. The initial stages in construction activity took place during the week of November 20.

Meanwhile, alterations have been made in the Murray Street and Orde Street buildings to accommodate data processing equipment and services formerly housed in the main Head Office building.

At the Service Centre in western Metropolitan Toronto, work is well advanced for the adaptation and extension of warehousing facilities and for the construction of a Transport and Work Equipment Administration Building. The warehousing facilities are being expanded in two major stages to take care of increasing demands on materials and supply services as they are foreseen up to the year 1990.

Research

The prime purpose of the Commission's research and testing activities is to ensure that new techniques are developed and applied to problems in design, construction, and operation of the system in order to achieve sound economies over the long term.

For improving protection and control of the power grid, a modern integrated solid-state system is under development. In addition to new types of control-room instrumentation, it includes new components for measuring high voltages and current, control-wiring arrangements that are immune



NANTICOKE G

A view of the interior of the plant during construction gives some impression of the size of the boiler which will occupy most of the open space in the foreground

to local interference in stations, and a line-protection relay of advanced design. Successful field trials of the equipment including staged-fault tests, as well as the satisfactory performance of an operations sequence analyser based on similar technology at Nanticoke GS, give some indication of the possible economies in station-control wiring and the likelihood of faster, more accurate relay performance under power-system fault conditions. In a study of the dynamics of heavy rotating equipment in large thermal-electric stations, techniques for measuring and analysing parameters which are of critical importance to reliable performance are being devised. When applied during commissioning activity, these techniques ensure that equipment is operating satisfactorily before it is placed in service. Subsequent in-service monitoring provides data on changes in performance, and facilitates the scheduling of preventive maintenance. This promises to be of particular value in nuclear-electric stations, where much of the equipment is not conveniently accessible for either inspection or repair.

For overhead transmission, effort is being continuously directed towards making high-voltage lines more compact, and electrical tests on full-scale structures of reduced dimensions are being made at the high-voltage test laboratory near Kleinburg. In a related activity some 500 semi-conductive insulator units of a novel design developed in co-operation with a Canadian manufacturer have been installed on a 115-kV line for trial operation at 230 kV with no increase in basic tower-head dimensions.

Preparatory to the construction of a single-pole, steel-tower, 230-kV line passing through suburban London, various studies were required to establish an appropriate footing design, to resolve several fabrication problems, and to confirm the adequacy of the tower-arm connections in resisting wind-load and conductor-galloping stresses. Carefully controlled thermal



NANTICOKE GS ON LAKE ERIE
When completed in 1977, the station, now being extended for Units 7 and 8, will have an installed capacity of four million kilowatts.

stress relieving of critical weld areas was specified, as well as the replacement of hot rolled baseplates with cast steel plates.

As another aspect of environmental studies, research is continuing with regard to any effects which power-system operation may have on the ecosystem. There is at present no indication that the discharge of warm water at major generating station outfalls has any adverse effect on aquatic flora and fauna.

Because of the large investment in heavy water for the CANDU reactors new methods of heavy-water separation by physical rather than chemical processes are under study. While two or three possible processes are receiving detailed attention, only one is under actual laboratory investigation.

As one method of restricting levels of radiation to acceptable levels in the work areas of nuclear-electric stations, a deep-bed granular carbon filter has been developed for removing radioactive particulates from reactor heat-transport circuits. Prototypes have been installed for demonstration purposes on loops at the Atomic Energy of Canada Limited Central Research Nuclear Laboratory and at Ontario Hydro's Nuclear Power Demonstration Station.

Operations research support was given in dealing with a diversity of problems relative to such subjects as optimum reserves of fossil fuels, brush control on rights of way, advanced systems for materials supply, life expectancies of equipment, forecasting of lake levels, and facility requirements for system maintenance in the future.

Staff relations

All activity in 1972 is of course overshadowed by the general strike by the 12,000-member local of the Canadian Union of Public Employees. It began on June 21, purportedly as a rotating strike, but it rapidly expanded in scope to become in fact the first general strike in the Commission's experience. It continued with varying degrees of pressure and stress for 121 days until October 21.

Service to the Commission's customers was maintained without major disruption for the entire period of the strike, for the most part by supervisory, management, and professional staff. Even the unavoidable service interruptions due to summer storms did not noticeably exceed normal duration limits. The redeployment of staff for this purpose, however, required that Pickering GS be closed down, and that the critical commissioning of the Bruce Heavy Water Plant be delayed. The capital construction program as a whole suffered delay and dislocation.

Early in the year the Union introduced a bargaining agenda of 176 items, specifying extensive improvements in the contract, including an 11 per cent wage adjustment in one year. During negotiations, and before the Commission had presented a wage offer, the Union obtained the approval of its membership for a strike, upon which it subsequently acted.

Where Union picketing occurred at Commission offices and other locations, it was for the most part peaceable, but police attendance was required on occasions when mass confrontations of up to 700 picketers occurred at major generating stations. With the assistance of law-enforcement agencies, special security precautions were taken during the strike to deal appropriately with any evidence of forcible restraint or intimidation of those continuing at work.

scaps,



Research workers who have set out by launch from Pickering GS are shown collecting samples for the purpose of studying any effect the station may have on aquatic life nearby. In the third photograph a laboratory technician is examining a specimen sample under a microscope



and also with the possibility of damage to Commission property. Though the large majority of striking employees clearly demonstrated that they were reasonable, patient, and understanding under the prolonged stress, a few more militant activists were responsible for malicious damage to an extent estimated at approximately \$100,000, and for other activities which led to more than 100 court actions against identified persons for infractions of the Criminal Code, The Highway Traffic Act, and The Public Works Protection Act.

The Commission's application to the Supreme Court of Ontario for an injunction limiting the number of picketers was adjourned subject to a rehearing on short notice, the Union having undertaken to advise all its chief stewards and picket captains on the legal restrictions on picketing activity. The Commission as one item on its bargaining agenda had requested the acceptance of a mutual protection clause, which had been included in a prior agreement. This would safeguard employees against reprisals for actions which, though they may have been questionable from one point of view, could be looked upon as permissible under the stress of the strike situation. The Union's prosecution of the Commission on grounds that the Commission's insistence on this point was interference in Union affairs was adjourned until January 1973.

When in mid October there were strong indications of the possibility that compulsory arbitration would be imposed by the Government of Ontario, both parties voluntarily agreed on October 19 to submit their seemingly irreconcilable differences to arbitration by a three-member board of their own choosing, and virtually all Union employees returned to work. Among the 32 items subject to arbitration, the major issues are related to proposed variations in the wage adjustments accorded to operators and to trades and weekly-salaried employees, greater flexibility in hours of work for tradesmen, the Union's claim to jurisdiction

over certain employees now classified as management, and the mutual protection clause.

The Chairman of the Arbitration Board is Mr. Robert S. MacKay, Q.C., LL.M., Dean of the School of Law at the University of Western Ontario, and the Commission and Union nominees are respectively Mr. L. Hemsworth and Mr. T.E. Armstrong. They are expected to make their report early in 1973.

At the end of the year, there were applications in process both by the Oil, Chemical, and Atomic Workers Union and by the Canadian Union of Operating Engineers for certification to represent employees at three thermal-electric generating stations where the Canadian Union of Public Employees is now the collective representative.

Staff statistics

To meet requirements of employee replacements, as well as demands for new activities, approximately 5,200 persons were engaged during the year, 163 to fill management and professional positions, 848 for technical and clerical positions, and the remainder for temporary and casual employment. The total number of persons engaged during the year is comparable with over 7,700 in 1971.

The average number of employees on the Commission staff in 1972 was 22,582, consisting of 17,137 regular and 5,445 temporary employees.

Training and development

During the first six months of 1972 common programs for supervisory staff provided training for 474 Commission employees and 55 employees from municipal electrical utilities.

The program for identifying and developing potential senior managers continued in 1972, with 58 candidates participating. Since the inception of the program, 233 persons had participated up to the end of 1972.

A total of 695 employees received technical and trades training, parts of the forestry and electrical maintenance training for learners being supplied by community colleges. Some 176 employees from electrical utilities received lineman-learner training, and 113 Commission employees participated in programs for developing other skills. Courses, meetings, seminars, and short-term activities required operation of the Conference and Development Centre near Orangeville at its optimum level of 85 per cent of capacity until June, when the strike disrupted normal operations.

Research activities were maintained during the year both for the assessment of current activities and in preparation for the future. They included a review of the effectiveness of staff-selection procedures, an analysis of staff response to new types of office arrangement, an assessment of nuclear-operator performance, and an evaluation of the costs and benefits of training programs.

Health and safety

The control of general industrial hazards remains a subject of prime importance. The hearing-protection program was continued in thermal-electric stations, and for forestry staff in the Regions. With the assistance of research and design staff, guidelines specifying acceptable noise levels for future generating stations have been devised. Protective measures have also been developed for the handling of mercury in thermal-electric stations. The concentration of various chemicals in oil mists used by foresters was investigated. Some progress has been achieved in the program to reduce the use of asbestos insulating materials and to control the associated inhalation hazard. The four-month strike unfortunately



BRUCE GS

These men are working on reinforcing steel for the concrete vacuum building.

Pension and Insurance Fund Statement of Assets

as at December 31, 1972

Notes

- ## Auditors' report (Pension and Insurance Fund)

We have examined the statement of assets of The Hydro-Electric Power Commission of Ontario Pension and Insurance Fund as at December 31, 1972. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances. In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1972.

39

resulted in loss of contact with a number of employees under treatment for alcohol addiction.

Under the rigorously controlled conditions laid down for the operation of nuclear-electric stations, the outstanding technical performance of Pickering GS has been matched by a highly gratifying accident-free performance. Protective measures and procedures were revised and extended to ensure that this level of performance is maintained.

For the more effective protection of the operating staff at nuclear-electric stations, a mobile whole-body counter was assembled, and a routine counting service was begun for the identification of hidden radio-nuclides in or on the body. A computer-based records program was established at each of three operating stations. In external dosimetry a system based on thermoluminescent dosimeters is under study.

The measurement of general environmental effects of nuclear-electric operations is dependent on the application of specific factors to the quantities of radioactive substances emitted by a station. A standard procedure which will be applicable to all stations has been developed for this purpose. The full implementation of such a standard will await the Atomic Energy Control Board's approval of sites and power supplies at the Bruce Nuclear Power Development and the transfer of some activities from the Chalk River Laboratory to the Central Health Physics group at Pickering GS Laboratory when that becomes available.

The frequency rate of disabling injuries, declined in 1972 from 10 to 9 per million man-hours worked, and showed a slightly greater improvement over the average of 10.4 for the preceding five years. The Regions had a frequency rate of 4 as compared with 5 for 1971, setting a new record. Western Region achieved the commendable goal of no disabling injuries for the year. The severity rate, which is based on the statistical allocation of a stipulated number of lost hours to specified types of accident fell from 1000 to 700, in part reflecting a decline in the number of fatal accidents from 5 in 1971 to 2 in 1972. The motor vehicle accident rate per million miles driven was unchanged at 10.

Employee relations

Under an amendment to the Labour Relations Act proclaimed in 1971, bargaining units of employee professional engineers may apply for certification under the Act. In 1972, however, the Society of Ontario Hydro Professional Engineers and Associates, which represents 1,200 members of the engineering and scientific staff, chose rather to retain its present informal agreement with the Commission, having gained Commission acceptance for including therein provisions for third party involvement. The agreement as modified now provides for arbitration of unresolved issues relating to salary schedules, and for mediation of other points in dispute.

The scope of employee benefits is under constant review. In view of the varied insurance requirements of employees in general, and the changing requirements of any one employee over the period of a working career, the group life insurance plan was amended during 1972 to give each employee some choice in selecting insurance coverage. This can now be obtained in amounts equivalent either to annual base earnings, or to two or three times annual base earnings.

General note on the Commission's operation

The Hydro-Electric Power Commission of Ontario is a corporate entity, a self-sustaining public enterprise endowed with broad powers with respect to electricity supply throughout the Province of Ontario. Its authority is derived from an Act of the Provincial Legislature passed in 1906 to give effect to recommendations of earlier advisory commissions that the water powers of Ontario should be conserved and developed for the benefit of the people of the Province. It now operates under The Power Commission Act (7—Edward VII, c. 19) passed in 1907 as an amplification of the Act of 1906 and subsequently modified from time to time (Revised Statutes of Ontario, 1970, c. 354). The Commission may have from three to six members, all of whom are appointed by the Lieutenant-Governor in Council. Two commissioners may be members of the Executive Council of the Province of Ontario.

In the operation of what is now a province-wide power system, the Commission is primarily concerned with the provision of electric power by generation or purchase, and its delivery in bulk either for resale for the most part by the 353 municipal electrical utilities now co-operatively associated with the enterprise, or for use by 80 direct, and generally industrial customers, including several

mining companies. Most of the direct customers cannot be conveniently served by municipal utilities. This primary aspect of operations accounts for approximately 90 percent of the Commission's energy sales. The remaining sales are made to retail customers either in rural areas or in certain communities not served by municipal electrical utilities. The Commission's retail customers, together with the direct customers, are served through what is known as the Power District. Except for this Power District operation, retail service throughout the Province is generally provided by the associated municipal electrical utilities, which are largely owned and operated by local commissions functioning under the general supervision of The Hydro-Electric Power Commission of Ontario as provided for in The Power Commission Act and The Public Utilities Act. Under this legislation, the Commission, in addition to supplying power, is required to exercise certain regulatory functions with respect to the municipal utilities served. For day-to-day business operations throughout the Province, the system is divided into seven Regions — Western, Niagara, Central, Eastern, Georgian Bay, North-eastern, and Northwestern — each of which is administered from an office conveniently located in a major municipality in that Region.

Financial features

The basic principle governing the financial operations of the Commission and its associated municipal electrical utilities is that service is provided at cost. In the Commission's operations, cost of service includes payment for power purchased, charges for operation, maintenance, and administration, and related fixed charges for interest and depreciation. There is also a statutory requirement that a sinking fund provision be made for the retirement of the Commission's debt over a 40-year period. The municipal utilities operating under cost contracts with the Commission are billed throughout the year at

interim rates based on estimates of the cost of service. At the end of the year, when the actual cost of service is established, the necessary balancing adjustments are made in their accounts. Retail rates for the municipal utilities are maintained at levels calculated to produce revenue adequate to meet cost.

The enterprise from its inception has been self-sustaining. The Province, however, guarantees the payment of principal and interest on all bonds issued by the Commission and held by the public. In addition, the Province has materially assisted the development of agriculture by contributing under The Rural Hydro-Electric Distribution Act toward the capital cost of extending rural distribution facilities. This contribution was discontinued in 1972.

HUDSON BAY

MANITOBA

ONTARIO

JAMES BAY



MINNESOTA

LAKE SUPERIOR

WISCONSIN

MICHIGAN

LAKE HURON

LAKE ERIE

Legend

Main Sources of Power

HYDRO-ELECTRIC	THERMAL-ELECTRIC Conventional Nuclear		CAPACITY IN KILOWATTS
			over 500,000
			100,000-500,000
			10,000-100,000
			under 10,000

GENERATING STATIONS UNDER CONSTRUCTION

--	--	--

OR BEING EXTENDED

--	--	--

ROUTES OF MAIN POWER FLOW



POINTS OF POWER INTERCHANGE



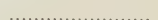
MAIN UTILIZATION CENTRES



Regions

①	Western	LONDON
②	Niagara	HAMILTON
③	Central	TORONTO
④	Georgian Bay	BARRIE
⑤	Eastern	BELLEVILLE
⑥	Northeastern	NORTH BAY
⑦	Northwestern	THUNDER BAY

REGIONAL BOUNDARIES



Statistical Summary

	1972	1971	1970	1969	1968	1962
Dependable peak capacity ('000 kW).	14,422	13,941	12,670	11,242	10,338	7,088
Primary peak demand ('000 kW)	12,739	11,534	11,289	10,555	9,994	6,293
Primary energy made available ('000,000 kWh)	73,497	68,134	64,289	59,426	55,789	35,783
Primary energy sales ('000,000 kWh)						
Municipalities	45,950	41,771	38,848	36,126	33,426	20,729
Retail	9,120 *	8,247	7,560	6,921	6,266	3,201
Direct	13,746 *	13,727	13,679	12,386	12,252	8,744
Total	68,816 *	63,745	60,087	55,433	51,944	32,674
Secondary energy sales ('000,000 kWh)	6,478	4,073	3,728	2,980	2,871	4,010
Number of customers ('000)	2,476 *	2,434	2,389	2,344	2,292	1,991
Average annual consumption per customer (kWh)						
Municipal residential	8,500 *	8,238	8,002	7,673	7,426	5,917
Farm	13,700 *	13,021	12,305	11,668	10,837	7,019
Miles of line						
Transmission	22,325	21,915	21,208	20,037	19,908	18,120
Rural distribution	53,102	52,532	51,777	51,320	50,534	48,562
Bonds issued (million \$)	556	501	485	397	270	50
Revenues (million \$)	665	607	534	469	415	249
Assets (million \$)	5,525	5,064	4,613	4,129	3,749	2,702
Staff, average for year.	22,582	23,264	22,584	21,686	19,550	14,920

*Preliminary

Ontario Hydro's regional offices

Western Region
1075 Wellington Rd. S.
London N6A 4P2
G. R. Currie, Manager

Niagara Region
Box 157, 1053 Main St. W.
Hamilton L8N 3B9
W.J. Jackson, Manager

Central Region
5760 Yonge St.
Willowdale M2M 3T7
F. J. Dobson, Manager

Georgian Bay Region
84 Collier St.
Barrie L4M 1H1
R. S. Griffin, Manager

Eastern Region
420 Dundas St. E.
Belleville K8N 1E8
T. E. Flinn, Manager

Northeastern Region
Box 3060, 590 Graham Drive
North Bay P1B 8L4
L. A. Coles, Manager

Northwestern Region
34 N. Cumberland St.
Postal Station "P"
Thunder Bay P7A 4L5
K. N. Bodkin, Manager



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Ontario Hydro-electric power

Ontario Hydro Annual Report 1973



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George E. Gathercole, Chairman and Chief Officer

June 17, 1974

The Honourable W. Darcy McKeough,
Minister of Energy.

Dear Sir:

I take pleasure in submitting herewith the
Annual Report of The Hydro-Electric Power Commission
of Ontario for the year 1973.

Respectfully submitted,

George E. Gathercole
Chairman

The Commission

GEORGE E. GATHERCOLE, LL.D., Chairman

D. ARTHUR EVANS, M.P.P., Vice-Chairman

DR. J. D. FLEMING, Commissioner

LOU E. DANIS, Commissioner

ROGER N. SÉGUIN, Q.C., LL.D., Commissioner

J. DEAN MUNCASTER, Commissioner

W. E. RANEY, Q.C., Secretary and General Counsel

D. J. GORDON, General Manager

Assistant General Managers

D. B. IRELAND — Regions and Marketing

M. NASTICH — Finance

O. S. RUSSELL — Personnel

H. J. SISSONS, M.B.E. — Services

H. A. SMITH, M.B.E., F.R.S.C. — Chief Engineer

Notes from the Chairman's office

Nineteen seventy-three was a year of significant achievement and change for Ontario Hydro. During the year two million kilowatts of new generating capacity were placed in service, a record for a single year. In addition important change was signalled by a new structure for the organization as well as by several major innovations in policy.

It was a year in which the bleak prospect of an Energy Crisis confronted the major industrial countries. With curtailed oil exports from the Middle East, many parts of the world experienced severe shortages of energy. Ontario, however, suffered no scarcity of electricity, and the demands of all Hydro customers were met.

Primary demand on the provincial power system rose to a record high of 13.6 million kilowatts in December, exceeding the 1972 peak by 6.8 per cent. If the oil shortage had not triggered a cutback in Christmas lighting, the increase would have been nearly 8.4 per cent.

Sales of secondary energy, mainly to the United States, grew by 19.2 per cent over the previous year. In September, the National Energy Board approved an increase in exports to the United States. Apart from extending assistance to hard-pressed American utilities, exports also provided substantial revenues for Ontario Hydro, to the benefit of all power customers in the Province.

Revenues from customers, including American utilities, rose 21.8 per cent over 1972 revenues to \$855.5 million. During the year also, total assets increased 14.4 per cent to \$6.3 billion.

The final chapter in the Pickering nuclear success story was written on May 28 when the fourth generating unit reached full power, only 12 days after the reactor went critical. The addition of this unit, along with that of three units at Nanticoke coal-fired station, raised Ontario Hydro's dependable peak capacity to 17.5 million kilowatts, 21 per cent greater than that in 1972.



The remarkable success of the CANDU reactor system and Pickering nuclear plant are now receiving recognition both nationally and internationally. Behind that recognition lies talent, hard work, enterprise, perseverance, and risk taking. While the road ahead will be far from smooth, we can draw strength from the outstanding success in which we share with Atomic Energy of Canada Limited and reflect that often only time can vindicate difficult and controversial decisions. This certainly applies to our decision to proceed with construction of the new Head Office building, a decision which roused such a furor during 1973.

Looking to the future, the Commission began planning for the construction of four new power stations having a total capacity of 10 million kilowatts: an extension to Pickering, a second Bruce nuclear station, a nuclear plant at Bowmanville, and a plant fired by residual oil at Wesleyville. Additional units are also planned to serve the growing demands in northwestern Ontario. New

generation capacity now under construction and being planned totals 18 million kilowatts. The hearings of the Ontario Energy Board, held for the first time in 1974, included a review of this program.

Our heavy reliance on nuclear power for future electrical needs makes adequate supplies of heavy water necessary. The high level of output achieved by the Bruce Heavy Water Plant has been gratifying, particularly in view of the difficulties that have plagued heavy-water production in Canada over the last decade. This plant, which was commissioned and operated by Ontario Hydro for AECL, was purchased by Hydro in 1973. To assure adequate supplies of heavy water, this facility will be enlarged to four times its present size.

The effects of decisions reached in 1973 will be felt far into the future. The cost of the expansion program, referred to above, exceeds \$15

billion over the next decade and reflects unprecedented inflation. To strengthen our financial position and moderate heavy borrowing required, we plan to reduce our funds held as reserves and invest the proceeds in new plant and facilities. A second measure, which was developed in 1973 to be introduced in 1974 and ensuing years, is to include a system expansion charge in the cost of power. Both of these measures will provide funds for new facilities and moderate Ontario Hydro borrowings.

Any step causing increased rates, which are under severe inflationary pressures, is taken reluctantly. But we are committed to keeping the financial position of Hydro strong in order that we may continue to provide essential electrical services.

Another significant change during the year was the new approach to our marketing program. Advertising budgets were reduced, and emphasis was placed



Using a tree spade, which can handle trees up to 20 feet high, the operator plants a tree along a 500-kV right of way.

A technician in a manufacturer's plant prepares nuclear fuel bundles for Ontario Hydro nuclear generating stations.





on the wise and efficient use of electrical energy. In this way conservation receives our increasing attention, and customers are reminded of the necessity to exercise greater care in husbanding all natural resources. Even a successful program of voluntary conservation, however, does not necessarily mean a curtailed need to expand electrical capacity. As fossil-fuel reserves diminish, electricity, supplied mainly by nuclear stations, seems destined to provide a growing share of total energy demands. Using energy sensibly and without waste will help to maintain high levels of prosperity and the well-being of our Province.

Ontario Hydro staff is its most important resource, and a step that may prove to be historic was taken in this respect during the year. Following the award by the arbitration board concerning the 1972 strike at Hydro, the executive of Local 1000 of the Canadian Union of Public Employees joined with the Commission to seek a better way of resolving future differences. A joint committee was established to search for a more compatible and productive relationship. Although it is too early to assess results, we are hopeful that this new approach

At Nanticoke GS, construction was over one-half completed at the end of 1973.

will lead to ways and means that will permit Ontario Hydro to serve the people of this Province better. During the year we also joined with the Society of Ontario Hydro Professional Engineers and Associates in submitting salary differences to compulsory arbitration. We trust that this approach will also work to the satisfaction of both parties and contribute to the high levels of productivity which we all seek.

Hydro's efforts to establish new relationships with the public, particularly those affected by transmission-line or power projects, continued during the year with public-participation programs in several parts of the Province. Ontario Hydro is committed to this open-planning process, which is unprecedented in North America. With experience, we hope that it will overcome lengthy delays in gaining approval for essential facilities. While we, as a public enterprise providing an essential service, must seek to win the confidence of the people and enlist their support through the public-participation process, public and regulatory authorities should acknowledge the compromise and trade-

offs involved in reconciling new power facilities with environmental concerns. The interests of our power customers and environmentalists should not be incompatible.

Prolonged delays are impeding the construction of essential transmission lines in several parts of the Province. If this situation continues, we will be in the position of having power plants, but no lines to deliver their output to those who need it. Delays can be extremely costly, and not only in terms of dollars. As mentioned earlier, the energy situation today emphatically confirms a trend that has been developing for some time: the transition to electric power. Forecasts in Canada, the United States, and other parts of the world show that electrical needs are increasing more rapidly than overall energy needs, which indicates greater demands on electrical utilities in the years ahead.

This is the last Annual Report of The Hydro-Electric Power Commission of Ontario. By Royal Proclamation of March 4, 1974, the "Commission" ceased to exist, and its successor, the

Corporation designated as "Ontario Hydro", came into being with a Board of Directors consisting of a chairman, a vice-chairman, a president, and not more than ten other directors.

During its 68-year history, the Commission established a world-wide reputation and contributed much to the growth and prosperity of this Province. I take this opportunity of thanking those who served with me on the Commission during its final year: Arthur Evans, Dean Muncaster, and particularly those whose term of office has ended: Douglas Fleming, Louis Danis, and Roger Séguin. They have made an important contribution to the Hydro enterprise and established a high standard for the new Board of Directors.

On behalf of the Commission, I also wish to express our appreciation for the staunch and valued partnership over many decades of the Ontario Municipal Electric Association, the Association of Municipal Electrical Utilities, and the 353 municipalities which they represent; they have a great role to play in the continuing development of Hydro in Ontario.



Farmer harvests grain grown along a 500-kV right of way.

Ducks make their home at the wild-life sanctuary which forms part of the Pickering GS site.



Meeting electrical requirements of customers

The primary peak demand on the Ontario Hydro system rose to an all-time high of 13,605,537 kW on December 17, 1973, exceeding the 1972 peak by 6.8 per cent. Primary energy requirements of 78,163 million kWh exceeded those for 1972 by 6.3 per cent.

The dependable peak capacity of Ontario Hydro's resources increased substantially to 17,501,000 kW, 21.3 per cent greater than that in 1972. The additions of three units at Nanticoke GS, one nuclear unit and one combustion-turbine unit at Pickering GS, the return to service of DeCew Falls GS, and firm power provided under the amended Electricity Contract with Hydro-Quebec and the Capacity Sale agreement with Manitoba contributed primarily toward the increase in dependable capacity.

Normal output at DeCew Falls was resumed on March 2, 1973 after a period from December 18, 1972, when output was virtually eliminated owing to curtailed diversion of water during relocation of a section of the Welland Ship Canal. The electrical output of Douglas Point GS varied after January 30, 1973 inversely with requirements to supply steam for the Bruce Heavy Water Plant.

During the year, 85,909 million kWh were generated and purchased. The output of hydro-electric stations decreased by 2 per cent from 1972 levels to 36,873 million

kWh, principally because of restricted flows on the Nipigon River due to high levels of the Great Lakes and deficiencies in run-off conditions on some West System watersheds early in the year. Thermal-electric generation increased by 14.4 per cent to 36,324 million kWh. Of this, gas and coal-fired units produced 22,700 million kWh, 12.4 per cent less than in 1972; nuclear operations provided 13,585 million kWh, an increase of 134 per cent over 1972; and combustion turbines supplied 39 million kWh, 26.7 per cent less than 1972 output. Purchased energy of 12,712 million kWh was 19.6 per cent higher than in the previous year, largely because of increased receipts from Quebec and Manitoba.

Fuel usage during 1973 continued to reflect the changing pattern of thermal operations. Coal consumption declined 13 per cent from that of 1972 to 7,287,300 tons, and fuel oil used in combustion-turbine units declined 11.9 per cent to 4,840,500 gallons in 1973. The amount of natural gas used increased 9.1 per cent to 40.7 billion cubic feet. Uranium consumption increased by 104 per cent to a total of 291 megagrams (321 short tons).

Although a heavy-water supply shortage existed in Canada during 1973, the available supplies were successfully managed

Technicians remove rotor of one generator during annual routine maintenance check at Pickering GS.





to minimize the adverse impact of the shortfall. The commissioning of Unit 4 at Pickering GS was accomplished with little delay by transfer of heavy water from Units 2 and 3 while they were undergoing their planned annual overhaul. The shortfall caused a temporary outage of Douglas Point GS and NPD GS. Sufficient heavy water was available by November to permit simultaneous operation of all units.

Utilities in New York and Michigan received greatly increased assistance during the year, particularly during the long, hot summer period. By September 16, total exports were rapidly approaching the limits set in the export licence and sales were sharply restricted. On September 28, the National Energy Board approved the sale of an additional 1,500 million kWh to utilities

in the United States, thereby increasing the limit for export sales during the year to 5,350 million kWh. By the end of the year, net export sales reached 5,339 million kWh, 43 per cent above those for 1972.

During the early months of the year, stream flows were augmented by water from storage reservoirs. The spring freshet restored most lakes to near desired maximum regulated elevations by the end of May. Favourable storage conditions prevailed in most areas of the East System during the balance of the year. In the West System, above normal rainfall during August and September restored total usable storage to about seasonal normal for the latter part of the year. Annual mean flows for the Niagara, St. Lawrence, and Ottawa Rivers exceeded their ten-year moving averages by 26.4 per cent, 31.3 per cent, and 23.2 per cent respectively,



At demonstration, organized by the Association of Municipal Electrical Utilities, manufacturers display equipment used in line construction and maintenance.

Street cars, powered by electricity, continue to provide clean and efficient transportation.

In the microwave room of the System Control Centre, an engineer and an attendant monitor the microwave alarm system.

Operator in the control room of a steel mill directs equipment by remote control.



but the annual mean flow for the Abitibi River was 13.2 per cent below the ten-year moving average.

System maintenance

Until recently, large transformer stations have included in their service equipment expensive, complex, and permanently installed oil-handling systems to process the large quantities of insulating oil associated with the electrical apparatus. New stations will not be so equipped. Instead a special mobile fleet fitted with oil-processing equipment, including heated tankers, filters, and degassers, is now being assembled to provide the service when and where it is required. Significant savings through eliminating duplication of equipment are expected.

New tools and techniques that permit live-line maintenance on the new 230-kV two-circuit pole lines and new techniques, that permit retensioning live conductors were applied. One technique uses two-man teams, lowered with their equipment from helicopters to the tower. One of the men, suspended by light-weight insulated equipment from the structure, is moved into position by his partner and changes

hardware on the conductor barehand. This technique greatly reduces the time needed for each structure.

The application of special equipment and new techniques in maintenance of the Bulk Power System has required the formation of a Central Line Maintenance Crew. After receiving training for specialized duties, this crew will undertake a thorough assessment of high-voltage lines to help ensure security of electric service in the system.

Headquarters for the crew are to be located in the Central System Maintenance Centre at Pickering, when the Centre is completed in 1975.

The seeding to grasses and legumes has become standard for all areas that must be kept clear on both new and old rights of way. This practice has been adopted to establish a ground cover that can control unwanted woody-plant growth, enhance rights of way for wild life and bee pasture, and reduce soil erosion and the resulting sedimentation of streams. In co-operation with the Ontario Ministry of Natural Resources and the Chief Apiarist of the University of Guelph, investigations contin-

ued into methods of establishing native shrubs from seed to form ground cover. During the year also, about 9,000 trees ranging from 10 to 25 feet in height were planted to provide immediate aesthetic improvement of the rights of way. In addition work forces of both contractors and Ontario Hydro made landscaping improvements at thirty-seven distributing stations, eight transformer stations, and one generating station.

Supply

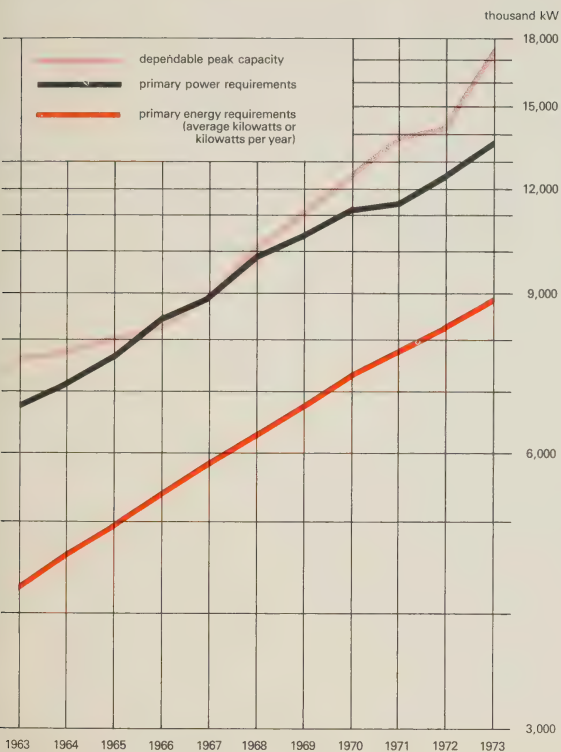
Above normal stream flows, combined with a full year of successful generation of power at nuclear stations, made it possible to reduce coal consumption in 1973 to about 87 per cent of 1972 usage. Total fuel requirements during the year, however, expressed in equivalent tons of coal, increased by 19 per cent. The sharp increase in international demands for fuels has confirmed the importance of Ontario Hydro continuing its extensive review of nuclear and fossil-fuel sources to ensure that future requirements for those fuels will be supplied.

During 1973, purchase orders placed for materials, equipment, and services totalled

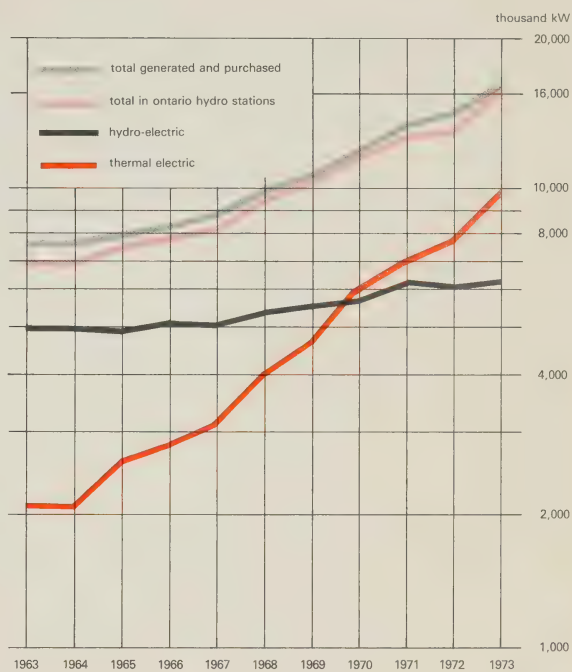
A research technician casts an epoxy-urethane termination on a new type of plastic-insulated power cable in preparation for tests at high voltage.



Growth in demands and resources 1973 - 1972



Dependable peak capacity of resources



NOTE ON THE RATIO SCALE

The above diagrams have a ratio scale for their vertical dimension. By plotting the data on this scale, specific changes show rates of growth in a proportional way for the variables being compared, and visual comparison of these rates of growth can be readily made.

\$396.6 million. The unfilled portion of orders placed in 1973 and earlier totalled \$699.3 million. Prices for most products escalated very rapidly in 1973, reflecting inflationary trends and general shortages. When fully commissioned early in 1974, the new warehouse at the Ontario Hydro Service Centre will incorporate new control and handling equipment to provide faster and more reliable deliveries of materials at lower cost than previous methods. For many users in the Regions, the new systems make it possible to fill and deliver orders within twenty-four hours. The facility provides for growth through the 1970's and physical expansion to meet foreseeable needs to 1990.

Primary energy demands (1972 - 1973)



The application of appropriate factors to the raw data on energy use month by month smooths the regularly recurring seasonal pattern of load fluctuation. This makes the prevailing direction of change and the effect of significant, but other than seasonal, variations more clearly apparent.

During 1973 the seasonally adjusted demand grew at about the same rate as in 1972. The rate of growth was irregular during the first five months and declined during the last quarter. The cause of this decline is not readily apparent although it may have been public reaction to the energy crisis.

Serving our customers

The number of customers receiving electrical service from Ontario Hydro and the associated municipal electrical utilities increased by 1.25 per cent over that for the previous year to about 2,511,000.

The municipal electrical utilities distributed power, supplied to them under cost contracts for resale, to about 1,816,000 customers. Ontario Hydro provided service to the balance, consisting of some 695,000 retail customers, for the most part located outside the areas served by the municipal utilities, and about 90 direct industrial customers supplied under special contracts.

A redesigned computerized billing system was developed to provide maximum flexibility, more accurate statistics earlier, and ease in making corrections and other changes. The system assists Area Offices to improve service to customers by providing instant access to data through an "On-Line-Enquiry" feature. The installation



At a new cement factory in eastern Ontario, electrically driven conveyor belt transports incoming raw material to storage area.

of the new system began late in 1973 and its extension to all Area Offices is to be completed early in 1974.

The extension of service to remote communities in northern Ontario continued in co-operation with the various parties and agencies of governments concerned. For the 45-mile extension to Savant Lake, both local industry and the Provincial Government joined in financial arrangements to permit completion of the line. At Fort Albany and the neighbouring community of Kashechewan, arrangements were completed to supply electric service to some 150 customers with power purchased from a local plant. Estimates were also prepared for supplying power to other remote communities, and proposals for financing a line to supply power to Moosonee were under review at the end of the year.

In the Eastern Region, a new cement plant that is expected to produce 1,000,000 tons per year came into service. This plant replaced an old plant that had about 40 per cent of the capacity of the new plant and was taken out of service because of obsolescence and environmental concerns. The new plant satisfies environmental requirements and will ultimately have a load of 25,000 kW, more than double that of the former plant.

To meet the increased demand for pulp and paper products in 1973, mills reverted to operation seven days per week. As a result, this industry required a supply of energy 12 per cent greater than in 1972. One pulp and paper company added a new stud mill to its other operations and increased its requirements for power by 4,000 kW.

The Electrical Inspection Department completed a very active year in administering Provincial regulations for public safety in respect of both electrical installations and new electrical equipment coming on the market. Inspection of new installations continued at a high level owing to the sustained high volume of new construction. In administering regulations stipulating that only approved electrical appliances may be offered for sale to the public, nineteen convictions for contravening the Electrical Safety Code were obtained from charges laid against retailers and distributors.

Marketing

Across North America electrical utilities have altered their marketing programs radically in the past few years. Ontario Hydro recognized the growing awareness, on the part of both the public and industry, of the need to use energy resources in a responsible way and modified its marketing program accordingly. For residential customers this is reflected in part by the distribution of a pamphlet entitled *The Wise Use of Electricity*. The pamphlet offers simple, practical, and common-sense suggestions on the best use of electricity in the home and was made available through fall fairs, media advertising, and direct mail. In co-operation with industry, marketing programs promoted standards for the use and development of equipment applications and for inspection to ensure the



Molten steel pours from an electric furnace at an Ontario steel mill where electric equipment helps the manufacturer to meet environmental requirements.

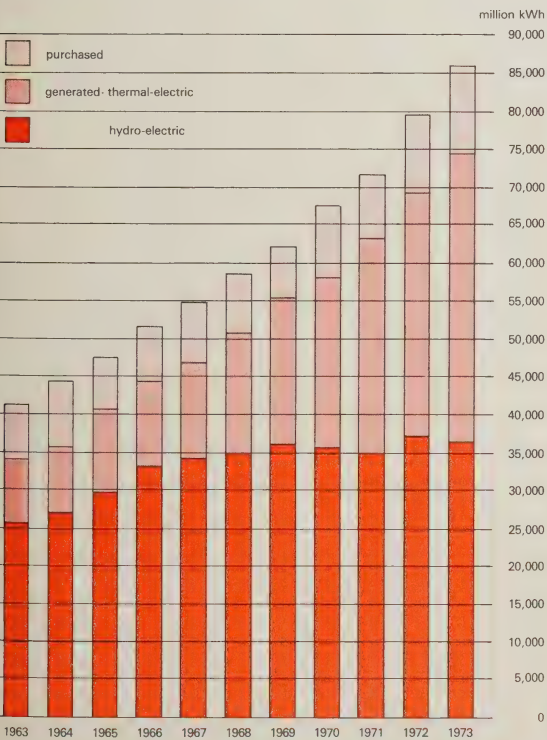
Insulation produced in this mill helps conserve energy by reducing heat losses in buildings where it is installed

Equipment at Ontario Hydro display in the Ontario Science Centre wins the attention of a young visitor.

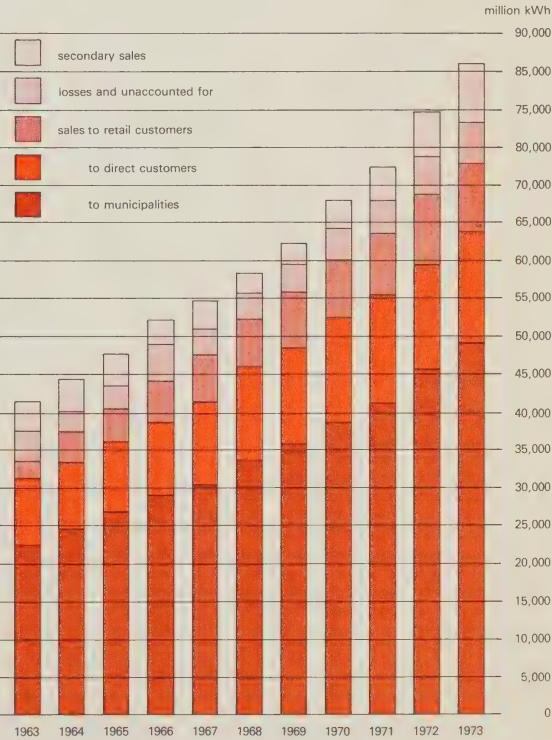
efficient performance of equipment and systems for electric water-heating and space conditioning. The application of "Medallion" standards for insulating and wiring new electrically heated homes, under the program sponsored by the Ontario Electrical League, was continued with increased stress on customer satisfaction from optimum efficiency in the home's electrical system. Homes constructed to meet these standards incorporate high quality of wiring, water-heating, and space-conditioning systems, with particular emphasis on thermal insulation for the dwelling. In 1973 a co-ordinated plan was undertaken in co-operation with two major manufacturers and their dealers for a responsible development of the residential

electric heat pump to improve performance, reliability, and service for this equipment. The equipment, utilizing atmospheric heat, provides both space-heating and cooling requirements from the same system. The heat pump has the unique feature of capability to reduce energy consumption substantially in comparison with other systems, and this offers a potential to reduce future energy requirements for space conditioning in Ontario. To assist consumers in reaching informed decisions in selecting electrical applications and using electricity wisely, a series of information booklets were prepared and distributed during the year. These provided information on such topics as the importance of insulating a home, Medallion home standards, and the Cascade water-heating service.

Energy made available



Disposal of energy

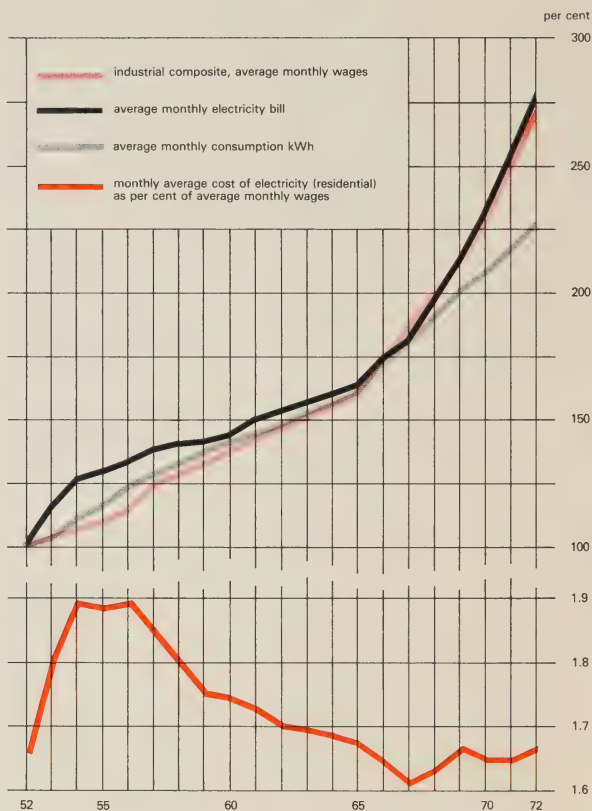


During the period 1970-1972, the Area Boards of Education in Metropolitan Toronto built 32 schools in accordance with standards established through the "Study of Educational Facilities" conducted by the Metropolitan Toronto School Boards. The adoption of these standards sought to "provide better value for expenditure in terms of function, initial cost, environment, and maintenance" and required extensive use of electricity. Based upon operating experience to date, the design has been applied in a second phase in which five more schools have been planned.

During 1973 significant progress was made in the development of improved farm wiring practices and systems. In co-operation with fire underwriters manufacturers inspection authorities, and the Ontario Ministry of Agriculture and Food, Ontario Hydro produced recommendations on protection of farm buildings and their electrical installations from damage by rodents. A test installation was completed and has brought about a continuing program of development and improvement. Findings from this study have been published in a new booklet *Guidelines to Farm Wiring*.

A new development in space heating for industry has been applied in a saw mill at Nairn Centre near Sudbury. Standard reinforcing wire mesh in the floor has been connected to a low-voltage supply using 300 kW of "off-peak" power. The application proved so successful during the first year of operation that the owners decided to use the same system in a new planing mill that has been almost completed.

Cost of residential electric service in relation to average income (1952 = 100%)



Recently the average monthly bill for residential electrical service has been rising more rapidly than the average consumption per customer, which of course reflects an increase in the average cost per kilowatt-hour. On the other hand there has been a fairly constant relationship between the index of this average monthly bill and that of rising levels of income (Ontario industrial composite).

Analysis of this relationship over the past twenty years indicates that the average monthly bill has not significantly exceeded 1.9 per cent of average monthly income. In 1972 it was well below 1.7 per cent, although average consumption per customer has more than doubled in the past twenty years.

Financial review

Revenues from the sale of primary power and energy amounted to \$793 million and exceeded those for 1972 by 19 per cent. A combination of increases in demands for power and energy and increases in rates accounted for the additional revenue. Increases, by class of customer, were:

Class of Customer	Increase in Revenue	
	\$ million	per cent
Municipal utilities	87	21
Retail customers	27	18
Direct customers	15	16

In 1973, revenues from the sale of secondary power and energy to interconnected systems, primarily in the United States, amounted to \$61 million, \$24 million or 65 per cent over those for 1972. Costs of \$562 million, excluding interest, exceeded those for 1972 by \$79 million, or 16 per cent. Operation, maintenance, and administration costs of \$242 million increased by \$35 million. The cost of purchased power rose by \$15 million to \$42 million in 1973 owing to an increase in the quantity of power purchased, and the nuclear agreement payback increased by \$9 million to \$17 million as a result of increased generation at Pickering GS. Depreciation costs increased by \$16 million to \$109 million in 1973, reflecting the continued growth of fixed assets in service.

Interest expense of \$193 million exceeded that for 1972 by \$28 million, primarily as a result of continued growth in the amount of borrowings needed to finance the capital construction program.

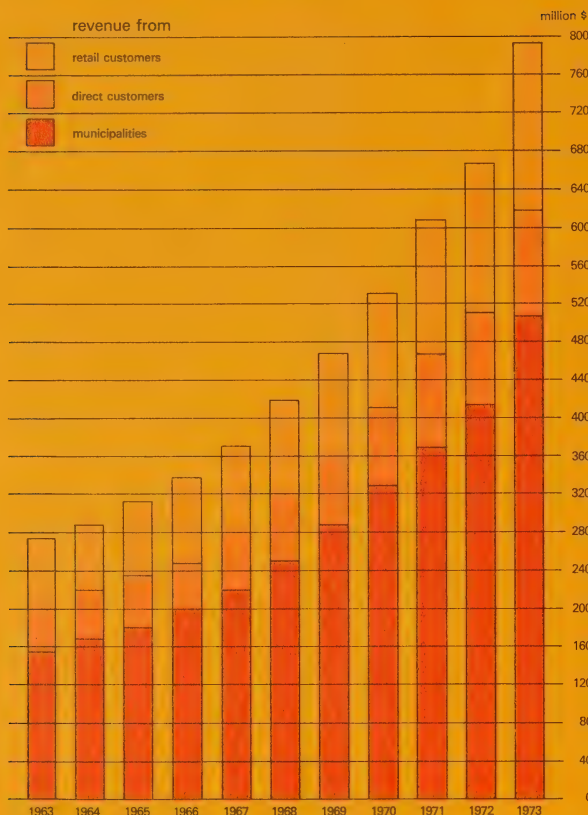
Amounts appropriated in 1973 for debt retirement and for stabilization of rates and contingencies amounted to \$100 million, exceeding those for 1972 by \$46 million. Capital expenditures in 1973 were \$997 million, including \$253 million for the Bruce Heavy Water Plant. Other major expenditures were \$558 million on generating stations and \$121 million on transformer stations and transmission lines. Expenditures on major generating stations were \$204 million for Bruce GS, \$135 million for Nanticoke GS, and \$106 million for Lennox GS.

The in-service cost of fixed assets and accumulated depreciation, by major asset classification, at the end of 1973 were:

Classification	In-Service Cost	Accumulated Depreciation
	\$ million	\$ million
Generation facilities	3,220	458
Transformation and transmission facilities	1,342	259
Retail distribution facilities	517	163
Heavy water production facilities	253	6
Administration and service facilities	167	72
Total	<u>5,499</u>	<u>958</u>

At the end of the year, current assets, other than cash and short-term investments, were \$25 million greater than in 1972. These assets included fuel supplies of \$120 million, other inventories of \$33 million, and accounts receivable of \$118 million.

Revenues from sales of primary power and energy



The unamortized balance of frequency standardization costs, incurred during the 1950's, was fully written off during 1973.

New bond issues totalled \$535 million (Canadian) during 1973. Of these, \$375 million were issued in Canadian currency, \$125 million in United States currency, and DM 100 million (\$35 million) in West German currency.

Bonds retired in 1973 amounted to \$123 million.

In addition to new bond issues, Ontario Hydro incurred a long-term debt of \$253 million, payable to Atomic Energy of Canada Limited, when the Bruce Heavy Water Plant was purchased.

At the end of 1973, accumulated equity was \$1,345 million, reflecting an increase of \$93 million over the amount at December 31, 1972. This increase was mainly the result of appropriations of net income in the amounts of \$65 million for debt retirement and \$35 million for stabilization of rates and contingencies.

Funds provided from operations increased by \$73 million to a total of \$252 million in 1973. Financing activities provided \$733 million, an increase of \$386 million over the amount in 1972.

The major application of funds in 1973 consisted of \$988 million on fixed assets—net. This use of funds increased by \$429 million over that in 1972.

Statement of Operations
for the year ended December 31, 1973

	1973 \$'000	1972 \$'000
Revenues		
Primary power and energy	793,654	664,834
Secondary power and energy	61,801	37,387
	<u>855,455</u>	<u>702,221</u>
Costs		
Operation, maintenance, and administration	242,232	207,714
Fuel used for electric generation	123,534	123,573
Power purchased	41,746	26,810
Nuclear agreement — payback (note 4)	17,560	8,212
Depreciation (note 5)	108,873	93,488
Amortization of frequency standardization	28,265	22,927
	<u>562,210</u>	<u>482,724</u>
Income before interest	293,245	219,497
Interest (note 6)	192,779	165,004
Net income	<u>100,466</u>	<u>54,493</u>
Amounts appropriated for:		
Debt retirement	65,688	58,177
Stabilization of rates and contingencies	34,778	(3,684)
	<u>100,466</u>	<u>54,493</u>

See accompanying notes on pages 25-28

Statement of Financial Position
as at December 31, 1973

Assets	1973 \$'000	1972 \$'000
Fixed assets		
Fixed assets in service, at cost (note 4)	5,499,616	4,751,604
Less accumulated depreciation	<u>958,796</u>	<u>848,781</u>
	4,540,820	3,902,823
Fixed assets under construction, at cost	1,081,281	852,093
	<u>5,622,101</u>	<u>4,754,916</u>
Investments (note 7)	<u>230,911</u>	<u>261,671</u>
Current assets		
Cash and short-term investments (note 8)	156,234	175,378
Accounts receivable	117,994	108,320
Fuel for electric generation, at cost	119,778	105,127
Materials and supplies, at cost	<u>32,770</u>	<u>31,530</u>
	426,776	420,355
Deferred charges and other assets		
Frequency standardization cost, less amounts written off	—	27,665
Debt discount and expense, less amounts written off	44,668	42,604
Long-term accounts receivable	8,266	9,446
Other assets	<u>10,444</u>	<u>8,029</u>
	63,378	87,744
	<u>6,343,166</u>	<u>5,524,686</u>

On behalf of Ontario Hydro



Chairman



Secretary

Liabilities

Long-term debt

	1973 \$'000	1972 \$'000
Bonds payable (note 11)	4,271,924	3,862,252
Plant purchase agreement (note 9)	250,135	—
	4,522,059	3,862,252
Less payable within one year	112,886	59,875
	4,409,173	3,802,377

Equity

Equities accumulated through debt retirement appropriations	942,586	876,900
Reserve for stabilization of rates and contingencies	276,565	249,186
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	1,345,846	1,252,781

Current liabilities

Accounts payable and accrued charges	194,648	168,565
Notes payable	178,800	150,650
Accrued interest	90,619	79,563
Long-term debt payable within one year	112,886	59,875
	576,953	458,653

Deferred liabilities

Customers' deposits	3,290	2,773
Workmen's compensation claims	7,904	8,102
	11,194	10,875
	6,343,166	5,524,686

See accompanying notes on pages 25-28

Ontario Hydro

Reserve for Stabilization of Rates and Contingencies for the year ended December 31, 1973

HELD FOR
THE BENEFIT
OF ALL
CUSTOMERS

	\$'000
Balances at beginning of year	256,572
Appropriated from net income	47,780
	<u>304,352</u>
Deduct:	
Refund of prior years' debt retirement appropriations (note 10)	—
Transfer of balance to amount held for the benefit of all customers (note 10)	(1,921)
Grant to Ontario Municipal Electric Association	—
	<u>(1,921)</u>
Balances at end of year	<u>306,273</u>

Equities Accumulated through Debt Retirement Appropriations for the year ended December 31, 1973

MUNICIPALITIES

	\$'000
Balances at beginning of year	615,045
Add:	
Debt retirement appropriated from net income	43,154
Equities transferred and refunded through annexations	5
	<u>43,159</u>
Balances at end of year	<u>658,204</u>

HELD FOR THE BENEFIT OF (OR RECOVERABLE FROM) CERTAIN GROUPS OF CUSTOMERS				TOTALS	
Municipalities	Power District				
	All Direct Customers	Direct Customers Former Northern Ontario Properties	Retail Customers		
\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
1,144	(7,028)	8,877	(10,379)	249,186	252,940
70	(3,883)	373	(9,562)	34,778	(3,684)
1,214	(10,911)	9,250	(19,941)	283,964	249,256
—	—	7,329	—	7,329	—
—	—	1,921	—	—	—
70	—	—	—	70	70
70	—	9,250	—	7,399	70
1,144	(10,911)	—	(19,941)	276,565	249,186

POWER DISTRICT	TOTALS	
	1973	1972
\$'000	\$'000	\$'000
261,855	876,900	818,725
22,534	65,688	58,177
(7)	(2)	(2)
284,382	942,586	876,900

See accompanying notes on pages 25-28

Statement of Changes in Financial Position for the year ended December 31, 1973

	1973 \$'000	1972 \$'000
Source of funds		
Operations		
Net income	100,466	54,493
Depreciation (note 5)	121,305	104,577
Amortization of frequency standardization cost, less interest on the account	27,665	21,231
Other items—net	2,863	(727)
	<u>252,299</u>	<u>179,574</u>
Financing		
Proceeds from issue of bonds	528,705	545,596
Less retirements	122,628	105,937
	<u>406,077</u>	<u>439,659</u>
Debt incurred on purchase of heavy water plant—less repayments	250,135	—
Increase (decrease) in notes	26,383	(66,556)
Decrease (increase) in amounts held in cash and investments	50,339	(26,709)
	<u>732,934</u>	<u>346,394</u>
Increase in accounts and interest payable	37,139	28,835
	<u>1,022,372</u>	<u>554,803</u>
Application of funds		
Expenditures on fixed assets—power supply facilities—net	733,613	559,175
—heavy water production facilities	254,877	—
Increases in fuel, materials and supplies	15,891	27,232
Increase (decrease) in accounts receivable	8,494	(30,792)
Refund of prior years' debt retirement appropriations (note 10)	7,329	—
Other items—net	2,168	(812)
	<u>1,022,372</u>	<u>554,803</u>

See accompanying notes on pages 25-28

Notes to financial statements

1. Change in name

Effective March 4, 1974, legislation came into force changing the name of The Power Commission Act to The Power Corporation Act. Under the revised Act the official name of the corporation was changed from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro".

2. Changes in basis of financial statement presentation

Significant changes in the basis of presentation have been made in the 1973 financial statements, and the 1972 amounts have been adjusted to a comparable basis. The principal revision has been a change in the statement of operations, to show net income from operations before appropriations for debt retirement and stabilization of rates and contingencies. These appropriations were previously shown as items under the "costs" heading in the statement of operations. Other changes have been made as follows:

- a) The net profit on redemption of bonds and sale of investments has been deducted from interest expense in the statement of operations. Previously, such profit was credited to the reserve for stabilization of rates and contingencies. In applying this change to 1972, interest expense and the amount appropriated from the reserve have been reduced by \$4,925,000.
- b) Interest expense has been changed to conform to the revised presentation of the statement of operations. The portion of interest that in previous years had been allocated to operation, maintenance and administration costs has been included in interest expense.
- c) The appropriation from net income for stabilization of rates and contingencies combines the provision (withdrawals) and interest which were formerly shown as separate items.

3. Accounting policies

Fixed assets

Fixed assets include power supply facilities (generation, transformation, transmission and distribution); administration facilities (land, buildings, office and service equipment); and heavy water production facilities. The cost of additions and replacement of component units is capitalized. The cost of fixed assets retired, less the proceeds of sales, is charged to accumulated depreciation with no gain or loss being reflected in operations. Cost includes direct material and labour, and overhead costs such as engineering, administration and procurement that are considered applicable to the capital construction program. Ontario Hydro capitalizes interest on construction costs based on the preceding three year average of the cost of long-term funds borrowed. The cost of producing heavy water includes direct costs, applicable overheads, interest and depreciation. The total cost of heavy water produced and purchased is capitalized as part of generation facilities.

Depreciation

Since January 1, 1971 all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates are based on the estimated service lives for the various classes of assets. The estimated service lives are subject to periodic engineering review. The service lives of major asset classes are:

Generation — Hydro-electric	50 to 100 years
— Thermal-electric	30 years
Transmission and distribution	25 to 50 years
Heavy water production facilities	20 years

Foreign currency translation

The liability for bonds payable in foreign currencies is translated to Canadian currency at the rates of exchange at time of issue. When bonds are retired, exchange losses or gains are charged or credited to interest expense in the statement of operations.

Translated at the rates of exchange which prevailed at December 31, 1973 the total liability for bonds payable in foreign currencies would be decreased by \$10,000,000.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies. The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for stabilization of rates and contingencies is the amount retained to stabilize the effect of abnormal cost fluctuations.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, benefit-based plan covering all regular employees of Ontario Hydro. The most recent actuarial valuation of the plan, at December 31, 1970, indicated an unfunded obligation of approximately \$32,000,000. The next valuation of the plan will be based on the position of the fund at December 31, 1973, as required by The Pension Benefits Act. The pension costs for each year include current service costs and the amount required to amortize the unfunded obligation over the years to 1988.

4. Nuclear agreement — Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amount to \$260,212,000 and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Commencing with the in-service date of each of these units in 1971, Ontario Hydro makes payments for a period of up to 30 years to each of the parties in proportion to their capital contributions. These payments, termed "payback", are calculated in accordance with the agreement and in a broad sense represent the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2. The parties' contributions to the capital cost and some items affecting the payback calculation have been provided for on an estimated basis and will be adjusted on determination of the final cost of construction of Pickering units 1 and 2. The effect of these adjustments will not be material.

5. Depreciation

Depreciation consisted of:

	1973	1972
	\$'000	\$'000
Power supply facilities—charged directly to operations	108,873	93,488
Administration and service facilities—charged indirectly to operations	12,432	11,089
Total charged to operations	121,305	104,577
Heavy water production facilities—charged to cost of heavy water	6,325	—
	127,630	104,577

6. Interest

Interest costs consisted of:

	1973	1972
	\$'000	\$'000
Interest on bonds, notes and plant purchase agreement	298,441	249,744
Less:		
Interest capitalized	64,420	50,970
Interest on heavy water production facilities—charged to cost of heavy water	10,020	—
Interest earned on investments	28,403	27,149
Net profit on redemption of bonds and sale of investments	2,219	4,925
Interest on unamortized frequency standardization cost	600	1,696
	<u>105,662</u>	<u>84,740</u>
	<u>192,779</u>	<u>165,004</u>

7. Investments

Investments with maturities beyond one year are recorded at amortized cost and consisted of:

	1973	1972
	\$'000	\$'000
Government and government-guaranteed bonds	207,915	247,676
Corporate bonds and notes	22,996	13,995
	<u>230,911</u>	<u>261,671</u>

Market value of these investments at December 31, 1973 was \$209,375,000.

8. Cash and short-term investments

Cash and short-term investments, with short-term investments recorded at cost (approximately market value), consisted of:

	1973	1972
	\$'000	\$'000
Cash	2,799	5,803
Notes of, and interest bearing deposits with, banks and trust companies	123,475	126,886
Government and government-guaranteed bonds	19,853	27,689
Corporate bonds and notes	10,107	15,000
	<u>156,234</u>	<u>175,378</u>

9. Plant purchase agreement

The Bruce Heavy Water Plant was purchased from Atomic Energy of Canada Limited on June 28, 1973 for approximately \$253 million. Ontario Hydro will pay Atomic Energy of Canada Limited equal monthly instalments of blended principal and interest to December 28, 1992, with a provisional interest rate of 7.795%. Principal repayments over the next five years will total \$35.6 million. The monthly payments and the interest rate will be adjusted on determination of the final purchase price. The adjustments are not expected to be material.

10. Reserve for stabilization of rates and contingencies

During the period from 1935 to 1949, appropriations for debt retirement charged to the direct industrial customers of the former Northern Ontario Properties were made at rates higher than those for customers in the former Southern Ontario System. On amalgamation of the two systems in 1962, the excess appropriation was determined and

segregated in the Reserve as held for the benefit of these customers of the former Northern Ontario Properties. In 1973 a refund of \$7,329,000 was made to those direct customers still in existence. The remaining balance of \$1,921,000 was transferred to the section of the Reserve held for the benefit of all customers.

11. Schedule of bonds payable at December 31, 1973

Maturity	Callable	Year of Issue	Interest Rate	Principal Outstanding December 31, 1973
			%	CAN \$ '000
Payable in Canadian currency (1)				
Mar. 1974	—	1969	7.50	19,268
July 1974	1972	1956	4.00	44,864
Oct. 1974	1972	1956	4.50	23,132
Dec. 1974	—	1969	8.50	19,553
Aug. 1975	1972	1957	4.75	30,546
Jan. 1976	1974	1956	4.00	43,347
Sept. 1976	— (2)	1970	8.50	75,000
Oct. 1976	—	1969	8.25	14,050
Nov. 1976	1974	1957	5.00	34,624
Jan. 1977	1975	1967	6.25	14,860
Mar. 1977	1975	1955	3.50	38,113
Apr. 1977	1974	1957	5.00	73,875
Feb. 1978	—	1972	6.25	30,000
Mar. 1978	1976	1958	4.50	32,627
Aug. 1978	—	1973	8.25	30,000
Oct. 1978	1976	1958	5.00	45,663
Nov. 1978	—	1973	8.25	25,000
May 1979	1974	1954	3.50	34,492
July 1979	—	1959	5.75	28,812
Oct. 1979	1974	1954	3.50	49,352
Feb. 1980	1978	1960	6.00	26,551
July 1980	1978	1960	5.50	35,529
Feb. 1981	1979	1961	5.50	39,355
June 1982	1979	1962	5.00	32,069
Mar. 1983	1980	1963	5.25	39,422
June 1983	1979	1963	5.00	51,452
Aug. 1983	—	1973	8.375	45,000
Nov. 1983	1980	1961	5.25	39,889
Feb. 1984	1981	1964	5.25	50,128
Oct. 1984	1980	1964	5.25	53,580
Feb. 1985	1981	1965	5.25	67,846
July 1987	1985	1967	6.25	24,017
Jan. 1988	1984	1966	5.75	48,142
Apr. 1988	1984	1966	6.00	46,852

Schedule of bonds payable at December 31, 1973 (continued)

Schedule of bonds payable at December 31, 1973 (continued)									Year of Issue	Interest Rate	Principal Outstanding December 31, 1973			
					Principal Outstanding December 31, 1973	Maturity	Callable							
Maturity		Callable	Year of Issue	Interest Rate		Payable in United States currency (1)					%	US \$'000	CAN \$'000	
						Held by Province of Ontario								
Payable in Canadian currency (1)														
						Feb. 1975	1958		1953	3.25		37,626	36,837	
July 1988	1984	1966	6.00	44,328		Nov. 1978	1958	(4)	1953	3.625		46,097	45,016	
Jan. 1989	1985	1967	6.25	38,110		Mar. 1980	1959	(4)	1954	3.125		28,911	28,214	
Sept. 1989	1985	1967	6.50	27,451		May 1981	1961	(4)	1956	3.875		40,736	40,000	
Mar. 1990	1986	1967	6.00	45,222		Feb. 1984	1969	(4)	1959	4.75		68,213	66,138	
Apr. 1992	1988	1968	7.00	39,920		Sept. 1990	1975	(4)	1965	4.75		47,701	51,338	
Aug. 1992	1988	1968	7.00	43,550		Apr. 1996	1981	(4)	1966	5.50		32,311	34,835	
Sept. 1992	1988	1968	7.00	56,444		Apr. 1997	1982	(4)	1967	5.625		59,249	64,119	
Mar. 1994	1989	1969	7.75	27,867		Dec. 1997	1982	(4)	1967	6.875		70,955	76,721	
Apr. 1994	1990	1970	9.00	47,541		Aug. 1998	1983	(4)	1968	7.125		70,980	76,170	
May 1994	1989	1969	7.75	31,375		Feb. 1999	1984	(4)	1969	7.375		73,980	79,482	
Oct. 1994	1989	1969	8.25	23,661		Sept. 1999	1984	(4)	1969	8.375		97,385	104,963	
Dec. 1994	1989	1969	8.50	21,632		Feb. 2000	1985	(4)	1970	9.25		99,020	106,199	
Feb. 1995	1990 (3)	1970	9.00	50,000		Aug. 2000	1985	(4)	1970	9.25		74,015	75,497	
June 1995	1990	1970	9.00	58,220		May 2001	1986	(4)	1971	7.85		89,650	90,525	
Nov. 1995	1990	1970	8.75	72,300		May 2002	1987	(4)	1972	7.70		99,145	98,154	
Feb. 1996	1991	1971	7.50	89,579		Dec. 2002	1987	(4)	1972	7.30		96,300	95,963	
Apr. 1996	1991	1971	7.625	55,155		Oct. 2003	1988	(4)	1973	7.90		125,000	125,038	
July 1996	1991	1971	8.25	71,496		Total payable in United States currency						1,257,274	1,295,209	
Sept. 1996	1991	1971	7.875	87,473										
Feb. 1997	1992	1972	7.375	68,675		Eurodollar-payable in United States currency (1)						U.S. \$ '000		
Apr. 1997	1992	1972	7.625	98,190		Jan. 1977-1986	1977	(4,5)	1971	8.25		35,000	35,295	
Sept. 1997	1992	1972	8.25	98,200										
Feb. 1998	1993	1973	7.75	100,000		Payable in West German currency (1)						DM '000		
May 1998	1993	1973	8.00	125,000		Aug. 1975-1984	1975	(4,5)	1969	7.00		150,000	40,401	
Nov. 1998	1993	1973	8.50	50,000		Dec. 1977-1986	1977	(4,5)	1971	7.50		100,000	30,445	
						June 1980-1987	1980	(5,6)	1972	6.50		100,000	30,783	
Total payable in Canadian currency					2,778,399	Mar. 1981-1988	1981	(5,6)	1973	6.50		100,000	35,480	
						Total payable in West German currency						450,000	137,109	
						Payable in Swiss currency (1)						Sw. Fr '000		
						Oct. 1983-1987	1983	(7)	1972	5.50		100,000	25,912	

(1) Bonds payable in United States currency, held by the Province of Ontario, have terms identical with issues sold in the United States by the Province on behalf of Ontario Hydro. All other bonds payable are guaranteed as to principal and interest by the Province of Ontario.

(2) Exchangeable at bondholder's option for an equal amount of bonds due September 1996 at 8.25% interest.

(3) Subject to maturity on February 1975 at the bondholder's option.

(4) Callable at various declining premiums.

(5) Payable in equal annual installments.

(6) Callable for 3 years at 101% and thereafter at par.

(7) Redeemable 1983-1986, by purchase in the market, of up to 10,000,000 Sw Fr annually, at prices not exceeding par.

Schedule of bonds payable at December 31, 1973 (continued)

Summary of bonds payable as at December 31, 1973	CAN \$'000
Canadian issues	2,778,399
United States issues	1,295,209
West German issues	137,109
Swiss issue	25,912
Eurodollar issue	35,295
	<u>4,271,924</u>

Bonds payable maturity schedule as at December 31, 1973	CAN \$'000
1974	106,817
1975	70,960
1976	171,524
1977	137,462
1978	218,919
1974-1978	<u>705,682</u>
1979-1983	577,084
1984-1988	483,093
1989-1993	302,035
1994-1998	1,428,209
1999-2003	<u>775,821</u>
	<u>4,271,924</u>

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1973 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations, and changes in financial position for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1973 and the results of its operations and the changes in its financial position for the year then ended, in accordance with generally accepted accounting principles applied, after giving retroactive effect to the changes in basis of financial statement presentation referred to in note 2 to the financial statements, on a basis consistent with that of the preceding year.

Toronto, Canada,
March 18, 1974.

CLARKSON, GORDON & CO.
Chartered Accountants

Planning and construction to supply future power needs

The principal design and construction activities in 1973 occurred in the fields of new generating plant, transformer stations, and administration and service buildings. The design and construction of new extra-high-voltage transmission facilities awaited public approval of routes after environmental hearings and public participation in planning for them had been concluded.

Progress on power developments

Design and construction for Bruce "A" GS progressed on schedule. The first of four 800,000-kW units at this nuclear-fuelled station has a scheduled in-service date in 1976 with the other units being placed in service at yearly intervals thereafter.

During 1973 the powerhouse electrical distribution system was energized and the 230-kV station switchgear ready to be energized early in 1974. The contract for site preparation and erection of the 500-kV switchyard was awarded in 1973. The water-treatment plant was almost complete, and erection of the condenser for Unit 2 and the standby generator had begun. Design of the steam-supply system for heavy-water plants had also begun. The fourth unit at Pickering GS was declared in-service on June 17, 1973, three and one-half months earlier than the

date scheduled in 1967 and in the record time of only thirty-two days after the reactor went critical. This marks the end of the highly successful first stage of the project, which required almost nine years. Minor modifications to the units and general clean-up work continued during the balance of the year. The heavy-water upgrading plant at this station was declared in-service on February 1, 1973.

In February work began on the conceptual design and preliminary engineering for a second-stage installation, comprising a further four identical units. Results of both a random sample of citizens in the area and a meeting held to discuss the project indicated that public reaction was generally favourable to the project.

At the Pickering site the area at the north-west corner of the property was developed as a park and wildlife sanctuary. The Metropolitan Toronto and Region Conservation Authority assumed administration of these in September 1973.

Rock groins extending 1,000 feet into Lake Ontario were constructed along both sides of the water intake channel. These groins reduce the possibility of weeds and silt



Involvement of the public forms an important part of planning for all new facilities.

entering the cooling and service-water systems and divert the discharge plume away from the intake

Construction of the Central System Maintenance Centre at the Pickering GS site began in 1973. The facility has been designed, when completed in 1975, to provide maintenance services for major electrical and mechanical equipment.

At Nanticoke GS, Units 2 and 3 were transferred to Operations. Although Unit 1 was commissioned in July, a subsequent core failure made it necessary to defer, until early 1974, the transfer of this unit. The progress of Units 4 to 8 inclusive continued on schedule. The powerhouse has been completely enclosed and heated. The station computer and operations sequence analysers have been fully commissioned for Units 1 to 4 and function on the operating units.

At Lennox GS excavation and substructures were almost complete at the end of the year. Structural steel for Units 1 and 2 had been erected, and the erection of structural steel for Units 3 and 4 had begun. The work on the boiler and the turbine-generator for Unit 2 were proceed-

ing on schedule, and erection of the Unit 1 boiler began in October. Construction activities on other steam-generating equipment, electrical installations, and auxiliary equipment for Units 1 and 2 were proceeding satisfactorily. Construction of the 653-foot stack and the erection of the three main oil-storage tanks had been completed by the year end. In addition the condenser-water intake had been constructed, and the station forebay was flooded. All activities were proceeding adequately towards meeting the in-service date of April 1975 for Unit 2 and the corresponding date of February 1977 for Unit 4.

At Lakeview GS both the dry and wet ash-transport systems for Units 1 and 2 were improved, a new chlorine building was constructed, and work began on extending the precipitators for each of Units 3 and 4. In addition various improvements were made in the instrument and control systems.

At Lambton GS various outstanding items were completed, and improvements made to other items for the boiler and turbine

systems after the initial in-service dates. In addition a 600-MVA autotransformer was placed in service, and the switchyard was modified to provide for the 345-kV power supply to Michigan.

At Arnprior GS access roads, field offices, and construction plant were established for the project, and the diversion structure and channel were completed. Geotechnical field investigations were completed and the soil conditions found in the lower river made it necessary to modify the design of the tailrace. This change caused the reduction of installed capacity from 87,000 kW to 78,000 kW at this plant.

System planning

The requirement that Ontario Hydro supply the electric needs of the Province imposes a responsibility for planning additional new generating capacity to meet demands which continue to grow from year to year. Although the annual rate of growth varies, the long-term pattern remains at a compound rate of about 7 per cent per annum. To meet this growth, the develop-

Construction crews excavate cooling-water intake tunnel at Bruce GS.





ment program already committed for construction includes new generating capacity which will come into service over the years up to 1979. Further new capacity must be committed to come into service during the years 1977 to 1982.

The plans for further new generating capacity to be added between 1977 and 1982 are being developed under the general approval given by the Government of Ontario in June 1973. These plans provide for new capacity in both the East and West Systems, and Ontario Hydro must obtain for each addition the concurrence of Government Agencies concerned with quality of the environment and with safety. Public participation in planning for the development of this capacity and for the acquisition of new generating sites is also required.

For the East System, proposed plans include three large nuclear plants, which will have a total capacity of about 8,000,000 kW, and one large oil-fuelled plant of 2,000,000 kW.

For the West System, proposed plans include two 150,000-kW fossil-fuelled units at the existing thermal station at Thunder Bay, followed by four 200,000-kW units at a new site. The latter requires acquisition of a site after involving public participation and obtaining the necessary Government approvals so that the first unit of the station may be brought into service in 1980 or later. It is possible that further purchases of firm power from Manitoba may be made, and if this happens, it may affect the time of the requirements for the above new capacity.

The plans for large nuclear-electric stations require an assured supply of heavy water for their operation. To achieve this, Ontario Hydro has exercised its options to purchase the Bruce Heavy Water Plant, which has a nominal capacity of 800 tons per year, has begun the construction of a second plant of the same capacity, and has initiated planning for plants having a nominal capacity of 1,600 tons per year.

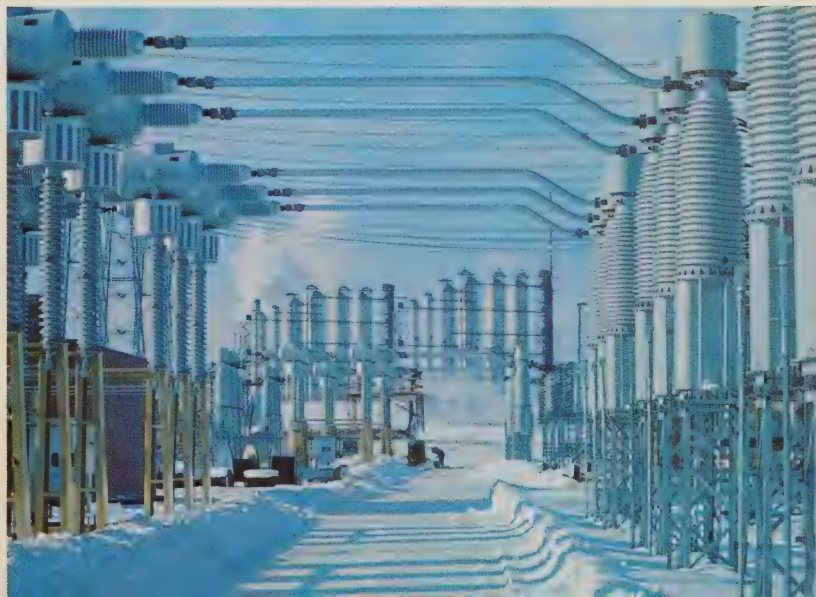
Early in 1973 two of the three interconnections with the Michigan Power Pool were converted from 115-kV to 230-kV



Gold-coloured metal cladding on exterior walls gives a more attractive appearance to Lennox GS.

At Bruce GS, construction workers install piping for the cooling-water system.

Switchyard structures at Bruce GS frame the Heavy Water Plant in the background.



operation, providing a combined nominal interconnection capacity of about 1,700,000 kW with Michigan. These increases have significantly improved the security of the Ontario Hydro system against major outages, permitted better frequency regulation, and effected economies in system operation through the exchange of power and energy. The changes are made in these and other interconnections after joint studies have been conducted along with the utilities with which Ontario Hydro is interconnected.

Transformer stations

Following the purchase of the first high-voltage switchgear using sulphur hexafluoride as an insulating medium for the 115-kV Toronto-Central TS, plans were considered for using this compact equipment at higher voltages. Tenders have been received for a major 230-kV station. Specifications have been issued and tenders called for similar equipment for two 500-kV stations.

The development of 230-kV bulk-oil circuit-breakers which can interrupt fault currents of 63,000 amperes symmetrical has made it possible to eliminate the use of

air-blast circuit-breakers at many locations. Air-pressure systems are therefore eliminated with considerable savings in installation costs as a result.

The need to build new 500-kV and 230-kV stations having short-circuit levels of 100,000 amperes symmetrical has required further development in several equipment areas. These include short-circuit testing of disconnect switches and grounding switches, and the use of extra-high cantilever strength station post insulators.

In 1973 one 550-MVA, 230-kV, three-phase transformer was ordered as a spare main transformer for Lambton GS, Pickering GS, Nanticoke GS, and Lennox GS. Current plans, based upon technical, economic, and system-security considerations, include the purchase of one additional 340-MVA, 230-kV, three-phase transformer as a spare main transformer for Lakeview GS and Douglas Point GS. New designs were developed to increase the capacity and reduce the environmental impact of transformer stations. These designs called for reduced height of station

structures to provide a lower profile, the use of tubing in station structures, and improved flexibility to suit a contoured site. During 1973 five new transformer stations were placed in service on the 230-kV network, and capacity was increased at five existing 230-kV stations. On the 115-kV network two new stations were added and capacity increased at ten stations. At the end of the year construction was proceeding on eight new transformer stations, five on the 230-kV network and three on the 115-kV network. In addition increases in capacity or changes in the supply voltage were being made at three 500-kV stations, two 230-kV stations, and three 115-kV stations.

Work is proceeding to increase the capacity and improve the reliability of Ontario Hydro interconnections with the Detroit Edison Company. One tie-line at J. Clark Keith GS has been changed from 115-kV to 230-kV operation, and a new regulating transformer has been ordered for this tie-line. At Lambton GS a new 230-kV — 345-kV transformer has been installed as a spare transformer on another interconnection which is to be converted to operate at 345kV.

Bruce Heavy Water Plant presents a colourful appearance under lighting at night. Construction crews erect forms and scaffolding in preparation for pouring concrete walls at Bruce GS vacuum building.

One of three oil-storage tanks at Lennox GS, 48 feet high and 360 feet in diameter, will store over 28 million gallons of oil.



Data acquisition and computer system

Work continued on this system to collect, process, and display data from one hundred and thirty generating and transformer stations at the System Control Centre at Richview. The multi-processing computer has been installed in the building addition at Richview, and remote terminal units are being installed in the field. The project will be completed early in 1975 at an estimated cost of \$37,000,000.

New buildings

At the new Head Office Building, located at the corner of College Street and University Avenue, construction has progressed to complete concrete work to the second floor above grade. Completion of the building is anticipated in September 1975.

At the Ontario Hydro Service Centre in western Metropolitan Toronto, two service buildings were completed during the year. The Transport and Work Equipment Administration Building was completed in April to house 75 employees of that department in two storeys, providing 12,000 feet of

completely air-conditioned space. In August the new Central Stores Warehouse was completed at the same site.

The new warehouse provides 140,000 square feet of floor space, or 1.8 million cubic feet, of which 80,000 cubic feet are humidity-controlled storage space, and has an office area of 7,000 square feet. The building is equipped with pallet racks providing 18,000 pallet openings to a maximum height of about 36 feet. The building is constructed of prefabricated concrete columns, beams, roof, and walls, and is electrically heated by underfloor electric mats using off-peak power. Three levels of sprinklers together with smoke curtains provide the maximum in fire protection.

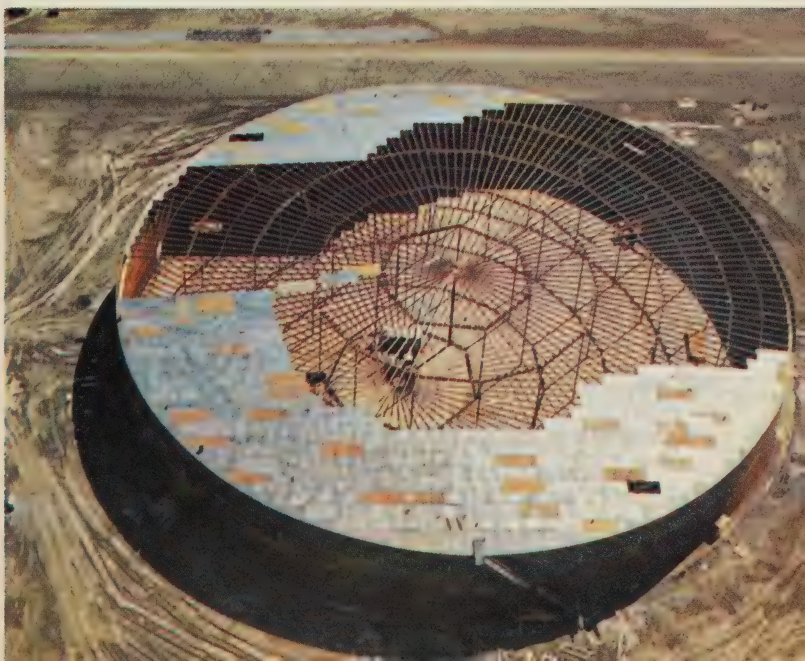
Twenty houses from the abandoned Cameron Falls GS Colony have been moved to the town of Nipigon, about 11 miles away, and located on individual foundations on serviced town lots. Each of these houses was sold to employee occupants who now occupy them in the Town. The remaining buildings of the colony are being sold for removal from the site.

Transmission and distribution

A second 500-kV transmission line between Essa TS and Kleinburg TS was

completed and placed in service operating at 230 kV until the 500-kV line from Parry Sound TS to Essa TS is completed early in 1974. These lines will permit the transfer of increased quantities of power between southern Ontario and the Northeastern Region.

In September 1973 Mr. Bruce Howlett, consultant to the Solandt Commission, recommended a new route for the proposed high-voltage transmission lines between Middleport TS and Oshawa area TS. Part of the recommended route would be located on the proposed new parkway belt around Metropolitan Toronto. The Solandt Commission conducted public hearings during October, November, and December 1973 to review this route. The final decision on the route depends upon the Solandt Commission recommendation and Government approval. If the route is to be on the new parkway belt, it will depend on the approved location of the belt, as determined by a separate inquiry.



An open-planning approach involving public participation has been applied in studies for selection of three other 500-kV lines. Of these studies, consultants have undertaken the environmental analysis for two and Ontario Hydro staff the third. The consultants on the line from Lennox GS to Oshawa area TS have completed their study, on which a report to the Solandt Commission is expected early in 1974, and a decision on the final route of the line by August 1974. Other consultants are conducting a similar study, to be completed in 1974, for the transmission line from Nanticoke GS to the London area. An Ontario Hydro team expects to complete its environmental study, involving public participation, for the 500-kV right of way from Bruce GS to the Georgetown area early in 1974, and plans to submit its report on the recommended route in May 1974 to the Provincial Government. The Government will arrange for public hearings, if considered necessary, and authorize construction on the route finally approved.

Research

The year 1973 marked the completion of 60 years of research and development activities in Ontario Hydro. From a small beginning in 1913, the Research Division staff has grown to number 375 persons engaged in a wide range of studies related to the design, construction, operation, and maintenance of the power system. The accomplishments of the Division have provided significant benefits not only to Ontario Hydro but also to utilities throughout the world.

The first phase of one research program on the feasibility of ducted air-medium underground transmission systems has outlined three possible designs to develop. Full-scale tests have been undertaken to establish cooling requirements. In another study, tests have begun on underground cable insulated by an extruded plastic. Also, in co-operation with British Columbia Hydro and a Canadian manufacturer, a testing program has been undertaken into using compressed sulphur hexafluoride gas to insulate cables having ratings up to 500 kV.

The development of improved insulators and of devices to control galloping of overhead conductors has made it possible

to reduce both the size of towers and the space needed for transmission-line right of way. Further research into the complex and obscure mechanics of conductor galloping is being conducted using both wind-tunnel tests and mathematical models.

For lightning protection at low-profile 230-kV stations, improved apparatus was developed and research began into short-circuit forces on strain bus and rigid bus. New bus designs for future 500-kV stations were tested using a newly installed surge generator at Kleinburg outdoor test station.

Research in areas of concern to the municipal electrical utilities was expanded to include corrosion of submersible transformers and the performance of outdoor lightning arresters.

Operations research support was provided to various parts of the Ontario Hydro organization. Important areas of support included computer design of transmission lines, forecasts of material requirements, optimum levels of fossil-fuel reserves, cost-estimating processes for construction work, and material-supply systems.

Research into a unique ion-exchange

Station bus equipment, insulated by use of sulphur hexafluoride, is installed for testing at Kleinburg test station. This kind of equipment permits reduction of the size of stations to one-tenth that of an equivalent station using conventional equipment.



precipitation system for removing phosphate from boiler blowdown water revealed high efficiency in phosphate removal, leaving the water suitable for reuse. This favourable result led to plans for adopting the system at Bruce GS. Continued and extensive monitoring in the vicinity of thermal-generating stations has disclosed no ill effects from warm-water discharges and stack emissions on flora and fauna. In related studies the characteristics of flue-gas plumes and concentrations of sulphur dioxide at ground level have been investigated under various atmospheric conditions. An analysis of coal, coal ash, and flue gas revealed forty trace elements, of which only four could be measured in flue gas. Levels of the four trace elements in the flue gas were well below permissible limits. In preparation for the sale of fly ash as a pozzolan, studies were made in several areas of fly-ash-concrete technology, including mix design, tests of fly-ash quality, and the effects of blending on ash

uniformity. Production patterns in the concrete industry were surveyed and the effect of improved fineness on the commercial worth of a pozzolan was evaluated.

Acoustic emission monitoring offers a potential non-destructive technique for detecting cracks and other defects in fabricated components. Using this technique cracks are detected as they develop in the parent material. As a crack grows stress waves are released and can be sensed by transducers, amplified, and recorded. The technique may be useful during welding and for on-line surveillance of critical equipment at nuclear stations.

Tests on nuclear-fuel sheaths have indicated that changes in methods of fabrication may increase the ductility of the material and reduce its susceptibility to stress-corrosion cracking. The effects of irradiation will be determined in further studies.



Construction crews install efficient precipitators designed to remove 99.5 per cent of the fly ash from flue gases at Naticoke GS.

Ontario Hydro staff

In April 1973 the Arbitration Board, which was appointed following the 1972 strike by the 12,000-member Local 1000, Canadian Union of Public Employees, issued its report. The report awarded salary increases of 8 per cent, 7 per cent, and 7 per cent, effective from April 1, 1972, April 1, 1973, and April 1, 1974 respectively, and provided that wages and salaries might be further adjusted in accordance with changes in the Consumer Price Index during the second and third years of the contract.

To deal with the problem of proposed variations between wage adjustments granted to operators and those to trades and weekly-salaried employees, the Board appointed a consultant having power to arbitrate changes. Failure of the Board to protect employees against reprisals related to the strike led both parties to court actions. The court actions were later set aside when both parties, acting on an invitation from the Chairman of Ontario Hydro, agreed to join in "a search for a better way" to resolve future differences. During the year three collective agreements were renewed with the Canadian Union of Operating Engineers representing about 450 employees. Terms and condi-

tions of these agreements were similar to those established by arbitration for employees represented by Local 1000, CUPE. The Labour Relations Board dismissed applications by the Oil, Chemical and Atomic Workers Union and by the Canadian Union of Operating Engineers to represent employees at three thermal-electric generating stations, where Local 1000 of the Canadian Union of Public Employees represents the employees, on the grounds that the applicants were proposing inappropriate bargaining units.

The Electrical Power Systems Construction Association and Canadian representatives of the international craft unions reached tentative agreement on the master portion of a multi-trade, multi-party collective agreement. Negotiations with international and local trade-union representatives achieved tentative agreement, subject to ratification by union members, on the appendices to cover 13 separate trades. Union representatives have presented these appendices to the union membership for ratification.

Construction labour agreements were renewed for three-year terms from 1972 to 1975 with the Hotel and Restaurant Employees' and Bartenders' International Union and the Office and Professional Employees International Union. At the end

Visiting school pupils examine models of nuclear generating-plant equipment at the Reception Centre of Pickering GS.



of 1973 negotiations were in progress for renewal of a collective agreement with Union Local 1788 of the International Brotherhood of Electrical Workers whose agreement had expired in July 1973. Ontario Hydro labour relations staff continues to assist electrical utilities in their negotiations for collective agreements. Co-ordination in bargaining and research on items of common interest has brought about improvement in the written contracts and greater uniformity of conditions among the electrical utilities. As unions prepare for changes under regional government, services by the Ministry of Labour are required increasingly to assist in settlements and in certification. Ninety of the 353 municipal electrical utilities now bargain with certified Locals of either the Canadian Union of Public Employees or the International Brotherhood of Electrical Workers. A third union, the International Union of Brewery, Flour, Cereal, Soft Drink and Distillery Workers has been certified to represent a unit of seven employees of a public utility which provides both water and electric services.

Three municipal electrical utilities experienced strikes which lasted more than three months before reaching agreement on annual wage increases of about 10 per cent and 7.5 per cent in two-year contracts.

Employee Relations

The protection of an employee's pension entitlement is recognized as an important feature of the Ontario Hydro Pension Plan. This protection was further increased during 1973 by reciprocal agreements with the Government of Canada and the Ontario Government. The new agreements provide that an employee who transfers employment from Ontario Hydro to an agency covered by the Superannuation Plan of either the Federal or the Ontario Government, or to Ontario Hydro from one of them, may transfer pension entitlement to the new employer.

At the end of 1973 approved changes in pension regulations awaited an Order-in-Council before amounts being paid to Ontario Hydro pensioners were improved.

Clerk-messenger rides on a bicycle to deliver stock releases and shipping instructions at the new Central Stores Warehouse.

Chef at Bruce GS construction must prepare two meals each day for about seven hundred workers.

Office staff of the station relax in the park on the site of Pickering GS



Pension increases planned were 2 per cent for those who retired during 1971 and 4 per cent for those who retired earlier.

At the close of the year a proposal to introduce staggered work hours for employees at Head Office in Toronto was being considered by both the Ontario Hydro Employees' Union and the Society of Ontario Hydro Professional Engineers and Associates. The proposal aims to offset anticipated congestion, when all Head Office employees are housed in the new Head Office in 1975, through applying a variable form of staggered hours.

Staff development and planning

During the year approximately 7,200 employees were engaged to replace former employees and to staff new activities. Of these, 149 filled management and professional positions, 1,154 clerical, technical, and trades positions, and the remainder were temporary and casual employees. In 1973 approximately 1,200 students had work-term assignments as summer employees or as part of a co-operative university-industry educational program.

The average number of employees on the Ontario Hydro staff was 22,962, consisting of 17,284 regular employees and 5,678 temporary employees.

New techniques for forecasting employ-

ment needs and training schedules are being developed and used.

Training and development

To supplement on-the-job training, formal training programs are designed to complement it by seeking to meet specific needs of units of the organization. In 1973, 900 employees in the professional, supervisory, and management staff along with 100 employees of the municipal electrical utilities took part in formal programs.

The Management Identification and Development program continued in 1973 with 60 participants. Since 1970, 294 persons have been through the program. A second program for identifying and developing less senior staff was designed in 1973 and was being tested at the year end before the program begins early in 1974.

At the Conference and Development Centre, near Orangeville, about 5,500 persons received training. This number included 2,200 trade and technical employees of Ontario Hydro and 260 employees of electrical utilities. The remainder of those receiving training were involved in various courses, seminars, conferences, and other short-term activities. All these activities required operation of the Centre at its optimum level of 85 per cent throughout the year.

Personnel research staff continued investigation into a wide range of related areas. Continuing research included investigations into the effects of office landscaping, surveys regarding attitudes and opinions of both management and performance-paid employees in relation to work satisfaction and the systems of job and performance rating. New research began on a number of new projects including human factors for the optimum design of control rooms, methods for selecting Nuclear and Systems Maintenance personnel, and an evaluation of training for general foremen.

Health and safety

The prevention of illness and injury, both occupational and other, continues to be the main objective in order that the staff may remain healthy and productive. A program of preplacement examinations or health questionnaires and some periodic health checks of regular employees is employed to ensure the fitness of employees. Nurses at the large thermal-generating stations performed over one thousand health checks on employees there, and medical assessments were made for employees having work problems related to illness or injury. The co-operation of both management and personnel assisted greatly in rehabilitating sick or injured employees.

In the safety program increased emphasis was given to protection against such industrial hazards as noise, dust and toxic gas inhalation, and work in confined spaces. Protection against the highly toxic hydrogen sulphide at Bruce Heavy Water Plant was stressed with start-up of the plant. In co-operation with the Public Relations and



Member of the site and maintenance staff at Lambton GS admires flowers on the station grounds which won commendation by the St. Clair Parks Commission for their attractive appearance.

Pension and Insurance Fund Statement of Assets
as at December 31, 1973

	1973 \$'000	1972 \$'000
Investments		
Government and government-guaranteed bonds	146,832	140,427
Corporate bonds	56,849	44,104
Corporate shares	119,232	113,242
Total bonds and shares	322,913	297,773
First mortgages	100,756	86,538
Term deposits and notes with banks	25,357	—
Total investments	449,026	384,311
Cash	74	135
Accrued interest	4,948	4,871
Receivable from Ontario Hydro	32	9,982
Receivable from employees	—	609
	454,080	399,908

Notes

- 1. The most recent actuarial valuation of the plan, at December 31, 1970, indicated an unfunded obligation of approximately \$32,000,000. The next valuation of the plan will be based on the position of the fund at December 31, 1973, as required by The Pension Benefits Act. The pension costs for each year include current service costs and the amount required to amortize the unfunded obligation over the years to 1988.
- 2. In the above statement of assets, bonds, deposits and notes are included at amortized cost, shares at cost, and first mortgages at balance of principal outstanding. The market value of total bonds and shares at December 31, 1973 was \$313,000,000.

Auditors' report
(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1973. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1973.

Toronto, Canada,
March 18, 1974.

CLARKSON, GORDON & CO.
Chartered Accountants

Consumer Service Divisions, the Health and Safety Division assumed responsibility for Public Electrical Safety. Employees received a wide variety of safety training. About 2,000 employees received on-the-job first aid training to qualify for St. John Ambulance certificates, and sixteen new instructors were qualified for a total of 51 in Ontario Hydro. About 3,000 employees received fire training, which assumed great importance with the operation of larger thermal plants and the introduction of new materials and fuels. Continued effort was directed towards reduction of radiation dose both to the public and to Ontario Hydro workers in the operation of nuclear-electric stations. An important contribution has been made to the design of Bruce GS to ensure lower radiation exposure to employees there. Environmental monitoring programs were continued. A document, establishing permissible releases from nuclear plants, has been prepared and is likely to become a standard reference in the Canadian nuclear program. The Health Physics staff made important investigations into the behaviour and char-

acteristics of airborne radioiodine at Pickering GS and developed equipment to monitor this emission. Further investigations were carried out into the development of improved protective clothing and communications for work at nuclear stations. The computer-based records program for personnel subject to radiation exposure has operated successfully and can be expanded to meet the needs for future increases in the number of personnel in the Ontario Hydro nuclear program.

Accident prevention

The frequency rate of disabling injuries continued to improve, decreasing to 7 per million man-hours worked in 1973 from 9 in 1972. This rate represents an even greater improvement over the average of 10.4 for the preceding five years. The severity rate, which is based upon a statistical allocation of a stipulated number of lost days to specified types of accident, rose from 700 in 1972 to 1,266 in 1973 owing to greater severity of accidents experienced in 1973. This is reflected in the number of fatal accidents, which increased from 2 in 1972 to 7 in 1973, and the number of accidents resulting in permanent partial disability, which rose to 8 in 1973 from 3 in 1972. The frequency of motor vehicle accidents declined in 1973 to 8 per million miles driven from 10 in the previous year.

Security

The physical security of essential stations is necessary to sustain the safe uninterrupted flow of electrical energy to customers. Security measures have therefore been directed primarily toward the protection of essential facilities. Responsibility for security measures assumes major importance with the increasing development of large installations to meet growing demands. The effective administration of security measures is evident from reduced vandalism, theft, and similar unlawful actions experienced by Ontario Hydro. Despite an increase in the general incidence of crime, the reported losses attributed to criminal actions were reduced from \$137,000 in 1971 to \$113,075 in 1973. The Security Staff receive continuing training in both practical and theoretical aspects of the work. As a service-oriented protection unit, personnel seek to keep abreast of both changes in social values and developments in the law. In addition the training program has developed an awareness of the immediate need of co-operation of fellow employees. This co-operation has assisted well qualified and equipped field personnel to protect Hydro facilities.

General Note on the Operation of Ontario Hydro

Ontario Hydro is a special statutory corporation which administers an electric power enterprise with broad powers to produce, buy, and deliver electric power throughout the Province of Ontario. It was created as a body corporate under the name of The Hydro-Electric Power Commission of Ontario by an Act of the Provincial Legislature passed in 1906. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c. 354 as amended.

The Power Commission Amendment Act, 1973, which came into force on March 4, 1974, changed the name of the Corporation from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro", and also changed the form of the administration of the Corporation from a six-man commission to a board of directors composed of a chairman, vice-chairman, president, and not more than ten other directors. The Act also changed the title of the Corporation's enabling legislation from "The Power Commission Act" to "The Power Corporation Act". These changes do not affect the Corporation's rights or obligations.

Ontario Hydro is primarily concerned with providing electric power in the Province, by generation or purchase, for delivery in bulk to municipalities, co-operatively associated with the enterprise, for resale, or to certain direct, and generally industrial, customers, including several mining companies. The remaining primary sales are made to retail customers either in rural areas or in certain communities not served by municipal electrical utilities. The Corporation makes secondary sales to other power systems.

In addition to supplying power, Ontario Hydro, as required by Provincial legislation, exercises certain regulatory functions with respect to the electrical service provided by municipalities. The Corporation maintains offices in a number of suitably located centres within the seven regions into which the Province has been divided for the local administration of its operations.











Financial Features

The basic principle governing the financial operations of the Corporation is that service be provided at cost, which is defined in The Power Corporation Act to include charges for power purchased, operation, maintenance, administration, fixed charges, and reserve adjustments. The fixed charges comprise interest, depreciation, and a provision for the retirement of debt over a forty-year period. The municipalities operating under cost contracts with the Corporation are billed throughout the year at interim rates based on estimates of the cost of service. At the end of each year, when the actual cost of service is established the necessary balancing adjustments are made in their accounts. Retail rates for the municipal utilities are maintained at levels calculated to produce revenue adequate to meet costs.

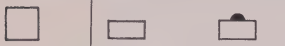
The Corporation from its inception has been self-sustaining. The Province, however, guarantees the payment of principal and interest on all bonds and notes issued to the public by Ontario Hydro.

Legend

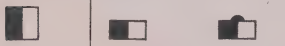
Main Sources of Power

HYDRO-ELECTRIC	THERMAL-ELECTRIC Conventional	Nuclear	CAPACITY IN KILOWATTS
			over 500,000
			100,000-500,000
			10,000-100,000
			under 10,000

GENERATING STATIONS UNDER CONSTRUCTION



OR BEING EXTENDED



ROUTES OF MAIN POWER FLOW



POINTS OF POWER INTERCHANGE



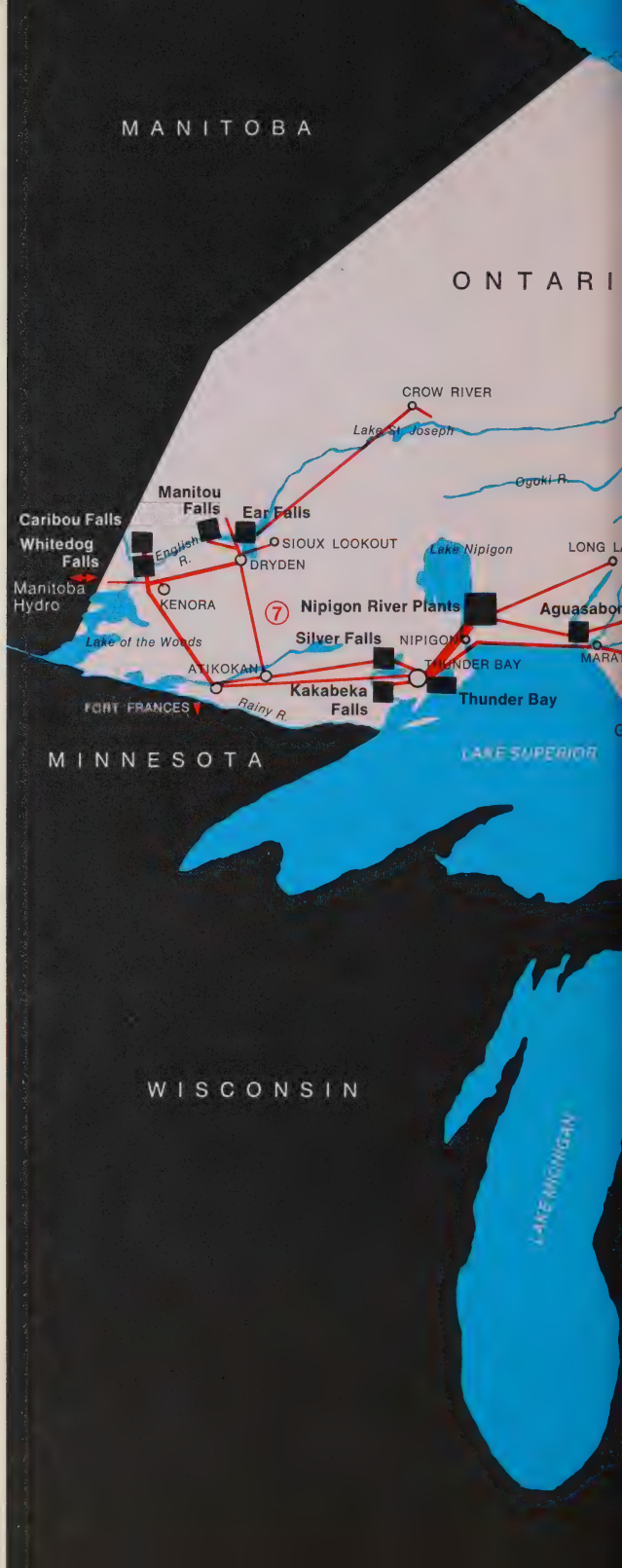
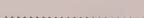
MAIN UTILIZATION CENTRES



Regions

①	Western	LONDON
②	Niagara	HAMILTON
③	Central	TORONTO
④	Georgian Bay	BARRIE
⑤	Eastern	BELLEVILLE
⑥	Northeastern	NORTH BAY
⑦	Northwestern	THUNDER BAY

REGIONAL BOUNDARIES





Statistical summary

	1973	1972	1971	1968	1963
Dependable peak capacity ('000 kW)	17,501	14,422	13,941	10,338	7,756
Primary peak demand ('000 kW)	13,606	12,739	11,534	9,994	6,797
Primary energy made available ('000,000 kWh)	78,163	73,497	68,134	55,789	35,783
Primary energy sales ('000,000 kWh)					
Municipalities	49,340	45,950	41,771	33,426	22,372
Retail	9,880	9,069	8,247	6,266	3,640
Direct	14,075	13,539	13,727	12,252	8,708
Total	73,295	68,558	63,745	51,944	34,720
Secondary energy sales ('000,000 kWh)	7,745	6,478	4,073	2,871	3,746
Number of customers ('000)	2,511 *	2,480	2,434	2,292	2,042
Average annual energy used per customer (kWh)					
Municipal residential	8,900 *	8,610	8,238	7,426	5,972
Farm	14,322	13,577	13,021	10,837	7,735
Miles of line					
Transmission	22,920	22,325	21,915	19,908	18,642
Area distribution	54,116	53,322	52,747	50,534	48,993
Bonds issued (\$ million, Can.)	535	556	501	270	120
Gross expenditures on fixed assets (\$ million)	997	562	507	329	108
Revenues (\$ million)					
Primary power and energy	794	665	607	415	271
Secondary energy	62	37	23	2	3
Assets (\$ million)	6,343	5,525	5,064	3,749	2,753
Staff, average for year	22,962	22,582	23,264	19,550	14,387

*Preliminary

Ontario Hydro's regional offices

Western Region
1075 Wellington Rd. S.
London N6A 4P2
G. R. Currie, Manager

Niagara Region
Box 157, 1053 Main St. W.
Hamilton L8N 3B9
W. J. Jackson, Manager

Central Region
5760 Yonge St.
Willowdale M2M 3T7
F. J. Dobson, Manager

Georgian Bay Region
84 Collier St.
Barrie L4M 1H1
R. S. Griffin, Manager

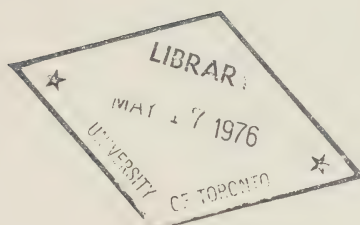
Eastern Region
420 Dundas St. E.
Belleville K8N 1E8
T. E. Flinn, Manager

Northeastern Region
Box 3060, 590 Graham Drive
North Bay P1B 8L4
L. A. Coles, Manager

Northwestern Region
34 N. Cumberland St.
Postal Station "P"
Thunder Bay P7A 4L5
K. N. Bodkin, Manager



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Ontario Hydro Annual Report 1974



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Ontario Hydro

620 University Avenue
Toronto, Ontario
M5G 1X6

May 9, 1975

The Honourable Dennis Timbrell,
Minister of Energy.

Dear Sir:

I take pleasure in submitting herewith the
Annual Report of Ontario Hydro for the year 1974.

Respectfully submitted,

Robert B. Taylor
Chairman

The Commission, consisting of a chairman, a vice-chairman and two commissioners administered the affairs of the Corporation from January 1, 1974, until March 4, 1974, when it was replaced by The Board of Directors pursuant to The Power Commission Amendment Act, 1973. The 1973 amendment also changed the corporate name from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro" and the title of the enabling legislation from "The Power Commission Act" to "The Power Corporation Act". (see p. 5)

The Commission

George E. Gathercole, LL.D. —Chairman

D. Arthur Evans, M.P.P. —Vice-Chairman

Dr. J.D. Fleming—Commissioner

J. Dean Muncaster—Commissioner

W.E. Raney, Q.C.—Secretary and General Counsel

D.J. Gordon—General Manager
(Appointed President March 4, 1974)

Assistant General Managers

D.B. Ireland—Regions and Marketing
(Retired October 15, 1974)

M. Nastich—Finance
(Appointed Vice-President, Resources,
October 15, 1974)

O.S. Russell—Personnel
(Retired October 15, 1974)

H.J. Sissons, M.B.E.—Services
(Appointed Vice-President, Distribution,
October 15, 1974)

H.A. Smith, M.B.E., F.R.S.C.—Chief Engineer
(Appointed Vice-President, Engineering
and Operations, October 15, 1974)

Ontario Hydro



Robert B. Taylor, Chairman



D. J. Gordon, President

Board of Directors

W. Dodge, O.C., Ottawa
Former Secretary-Treasurer
Canadian Labour Congress

D. Arthur Evans, M.P.P., Bradford
Parliamentary Assistant to the
Minister of Energy

Andrew Frame, Burlington
Professional Engineer

George E. Gathercole, LL.D., Toronto
Chairman, Ontario Hydro
(Retired December 31, 1974)

D. J. Gordon, Toronto
President, Ontario Hydro

Douglas G. Hugill, Sault Ste. Marie
Tax Consultant

Allen T. Lambert, Toronto
Chairman and Chief Executive Officer
The Toronto-Dominion Bank

J. Conrad Lavigne, Timmins
President, Mid Canada Television System

Philip B. Lind, Toronto
Vice-President and Secretary
Rogers Cable Communications Ltd

J. Dean Muncaster, Toronto
President and Chief Executive Officer
Canadian Tire Corporation Limited

Mrs. A.C. Pigott, Ottawa
President and Chief Executive Officer
Morrison Lamothe Foods

Robert B. Taylor, F.C.A., Toronto
Vice-Chairman, Ontario Hydro
(Appointed Chairman January 1, 1975)

Robert J. Uffen, F.R.S.C., Kingston
Dean, Faculty of Applied Science,
Queen's University
(Appointed Vice-Chairman January 8, 1975)

Officers

George E. Gathercole, LL.D.
Chairman
(Retired December 31, 1974)

Robert B. Taylor, F.C.A.
Vice-Chairman
(Appointed Chairman January 1, 1975)

D.J. Gordon, President

M. Nastich
Vice-President, Resources

H.J. Sissons, M.B.E.
Vice-President, Distribution

H.A. Smith, M.B.E., F.R.S.C.
Vice-President, Engineering and Operations

W.E. Raney, Q.C.
Secretary and General Counsel

General Managers

(Appointed October 15, 1974)

P.G. Campbell
Design and Construction

W.C. Cunningham
Services

G.R. Currie
Regions and Marketing

W.D. Gillman
Computers

F.W. Gomer
Finance

L.G. McConnell
Operations

G.M. McHenry
Personnel

Chairman's Foreword

For Ontario Hydro, 1974 was a year of continuing adjustment to a changing social and economic climate.

It was a year in which Hydro took important steps to improve and strengthen its relations with the public it serves. While recognizing that its prime responsibility is to provide the people and industries of Ontario with electric power at the lowest feasible cost, Ontario Hydro realizes, too, that it has important obligations to protect Ontario's environment. It also accepts, as an integral part of its role, the desirability of involving the public in the major decisions for system expansion that must be made to ensure an adequate supply of electricity in the future.

Equally important, the past year brought a keener appreciation of the need to learn how to conserve energy. The oil crisis abated, but left in its wake the vivid realization that the day of "cheap" energy was over and that there exist definite limits to such non-renewable resources as coal, oil, and natural gas.

Double-digit inflation appeared on the Canadian scene for the first time since 1951. The prices of almost everything Ontario Hydro needs to produce and distribute power — labour, fuel, steel, construction equipment, and money — all rose alarmingly in 1974. The cost of delivered coal, for instance, went up 55 per cent — from \$12.75 to \$19.75 a ton. In the face of this accelerating inflation, Ontario Hydro had no alternative but to announce substantial rate increases for 1975.

With inflation continuing at an undiminished pace, it is now apparent that Hydro will be forced to apply for even more substantial rate increases to take effect in 1976.

It became evident in 1974 that fuel availability will pose a problem in the future. U.S. coal will be scarcer and dearer because of production and market conditions; therefore, Ontario Hydro is actively exploring the development of Western Canadian coal resources as a supplementary source of supply. There is concern, however, about the longer-term supply of fossil fuels of all kinds for generating electricity. Inasmuch as uranium is indigenous to Ontario and the CANDU reactor has proved eminently successful, it seems virtually certain that future expansion will be based on nuclear power complemented by the addition of some fossil-fuelled generating stations.

The continuing need to maintain adequate power reserves was clearly demonstrated in 1974 when two major equipment failures — one at Nanticoke and the other at Pickering — sharply reduced Ontario Hydro's generating capacity. Because of the bleak supply outlook in late November as a result of this loss in generating capacity, arrangements were made with American utilities to obtain emergency power supplies. As it turned out, only minor assistance was needed. Peak customer demand in December was lower than the previous year's high because of warm weather combined with a slowdown in economic activity, and three of the Nanticoke generating units

were returned to service on a temporary basis around the middle of that month. So the crisis passed.

Last year saw Ontario Hydro's first exposure to a formal review of its rate proposals before the Ontario Energy Board. The hearings were open to the press and public. The Energy Board closely scrutinized the Corporation's expansion plans to 1982, its load forecasting methods, and its financial policies and objectives.

In July, the Government of Ontario announced that Ontario Hydro's report, *Long-Range Planning of the Electric Power System*, would provide the basis for public hearings and review of the province's power requirements to 1993. More than 14,000 copies of the report were distributed by Hydro in 1974 to representatives of government, industry, planners, associations, special interest groups, and private citizens. Because many of the social, economic, and environmental objectives of our society are in conflict, choices or trade-offs which rest upon value judgments must be made. The long-range planning report is, by design, general and emphasizes fundamental concepts. It should prove to be a valuable catalyst for wide-ranging and important discussions concerning the areas of conflict.

This is the first annual report of Ontario Hydro since administration and control of the corporation were transferred from the Hydro-Electric Power Commission of Ontario to a Board of Directors on March 4, 1974. Although Hydro's function and its relationship to the local utilities remain the same, the larger Board represents a greater diversity of interest and viewpoint than did the smaller Commission.

George Gathercole, who had served for eight years as Chairman of the former Commission, became the first Chairman of the new corporation. He retired at the end of 1974 and I should like to acknowledge the enormous contribution made to Ontario Hydro and the people of Ontario by Mr. Gathercole and the former Commissioners.

This report would not be complete without an expression of appreciation for the continuing co-operation received from the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities. The Board of Directors intends to do all it can to maintain and strengthen these all-important relations.

In conclusion, I should like to pay tribute, on behalf of the Board, to the men and women of Ontario Hydro, who are the real secret of its success. The Province of Ontario has been well served by these dedicated people of integrity, foresight, skill, and courage.



Robert B. Taylor, Chairman



Closed circuit video screens in control room at Nanticoke GS show flame pattern inside the furnace of Unit No 4.

The Corporation

Ontario Hydro is a special statutory corporation which administers an electric power enterprise and has broad powers to produce, buy, and deliver electric power throughout the Province of Ontario. It was created as a financially self-sustaining body corporate under the name of The Hydro-Electric Power Commission of Ontario by an Act of the Provincial Legislature passed in 1906. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c 354 as amended.

The Power Commission Amendment Act, 1973, which came into force on March 4, 1974, changed the name of the Corporation from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro". It also changed the form of the administration of Ontario Hydro from a six-man commission to a Board of Directors composed of a Chairman, a Vice-Chairman, a President, and not more than 10 other directors. The Act also changed the title of the Corporation's enabling legislation from "The Power Commission Act" to "The Power Corporation Act". These changes did not affect the rights or obligations of the Corporation.

In October, the Board of Directors approved a major reorganization at senior management level, including establishing a new Corporate Office. The Corporate Office, comprising the president and three vice-presidents, will focus on overall corporate objectives and policies, with day-to-day operations being the responsibility of seven general managers who report to the vice-presidents.

This form of reorganization was selected as being the most effective and adaptable of the alternatives suggested by Task Force Hydro in order to meet the needs of Ontario Hydro's customers and the public. Task Force Hydro, appointed by the Ontario Government, conducted a wide-ranging study and made a

number of recommendations, including the setting up of a corporate office.

Ontario Hydro is primarily concerned with providing electric power in the Province by generation or purchase and delivering it in bulk to the municipalities for resale, and to certain direct industrial customers including several mining companies. The remaining primary sales are made to retail customers either in rural areas or in certain communities not served by municipal electrical utilities. In addition Ontario Hydro makes secondary sales to other power systems.

In addition to supplying power, Ontario Hydro, as required by Provincial legislation, exercises certain regulatory functions with respect to the electrical service provided by municipalities. For the administration of its operations Ontario Hydro maintains offices in a number of suitably located centres within seven regions into which its power system has been divided.

The basic principle governing the financial aspect of Ontario Hydro's operations is that service is provided at cost, which is defined in The Power Corporation Act to include charges for power purchased, operation, maintenance, administration, fixed charges, and reserve adjustments. The fixed charges comprise interest, depreciation, and a provision for the retirement of debt over a 40-year period. The municipalities, operating under cost contracts with Ontario Hydro, are billed throughout the year at interim rates based on estimates of the cost of service. At the end of each year, when the actual cost of service has been established, the necessary balancing adjustments are made in their accounts.

The Province guarantees the payment of principal and interest on all bonds and notes issued to the public by Ontario Hydro. In the case of borrowing from the United States, the Province issues bonds on behalf of Hydro.

Power supply

Ontario Hydro serves an operational area of 250,000 square miles that extends about 1,000 miles from east to west and as far north as James Bay.

Hydro and the 353 associated municipal electric utilities provided electrical service to about 2,584,000 customers in 1974, reflecting a 1.9 per cent increase over the previous year.

The municipal utilities distributed power, supplied to them under cost contracts for resale, to about 1,863,600 customers. Ontario Hydro served 720,300 retail customers, directly, under its rural retail system and about 100 large industrial customers that have special requirements.

Primary energy requirements rose to 82,696 million kilowatt-hours in 1974, exceeding those for the previous year by 5.8 per cent. However, the mildest December in many years, combined with a slowdown in economic activity, resulted in a maximum primary peak demand of 13,538,232 kilowatts — a fall of 0.5 per cent from 1973. (The winter peak was carried over to January 1975 and exceeded the previous winter peak by 2.2 per cent)

The mild weather alleviated a temporarily marginal supply situation. A metallurgical failure of an end ring resulted in a fire in the No. 2 unit at Nanticoke GS and caused the removal from service of four coal-fired units while one nuclear unit at Pickering GS was shut down to investigate heavy water leaks in the pressure tube system. As a result, the system's dependable peak capacity was reduced to 15,758,500 kW, 10 per cent below the corresponding level in 1973.

A possible power shortage was averted when three of the Nanticoke units were restored to service on a temporary basis by the time the weather turned colder.

Total energy generated by Hydro or purchased from other utility systems increased 5.7 per cent to 90,774 million kWh in 1974. Ontario Hydro's stations produced 84.1 per cent of this total, compared with 85.2 per cent in 1973.

For the first time, thermal-electric plants produced more energy than hydro-electric stations. Of the total kilowatt-hours generated and purchased, fossil-fuelled and nuclear thermal-electric plants generated 42.5 per cent, compared with 41.6 per cent for hydro-electric. Nuclear stations accounted for 14.9 per cent and energy purchases 15.9 per cent.

Hydro-electric station output of 37,749 million kWh was 2.4 per cent more than in 1973, largely because of increased output in Northwestern Ontario where voluntary restrictions in effect since 1972 on the Nipigon River flow were removed.

Thermal-electric generation totalled 38,569 million kWh, an increase of 6.2 per cent in the year. Of this, gas and coal-fired units produced 25,011 million kWh, (up 10.2 per cent), nuclear operations provided 13,536 million kWh, (a decline of 0.4 per cent reflecting loss of the Pickering unit), and combustion-turbine units supplied 22 million kWh, (44.7 per cent less).

Hydro purchased 14,456 million kWh, a 13.7 per cent increase over 1973, mainly because of increased deliveries under contracts with Quebec and Manitoba.

Apart from the heavy water leaks in unit 3 at Pickering, which involved no risk to either the public or employees, the Pickering units continued to operate well, with outstanding performance by unit 4. This unit achieved a gross capacity factor of 94 per cent, the best performance of any reactor in North America. Units 1 and 2 also achieved high capacity factors in 1974.

Production of heavy water — an essential ingredient along with natural uranium in Canadian nuclear stations — has been beset with difficulties for many years. After initial difficulties, the Bruce Heavy Water plant, which commenced operation the previous year, achieved a breakthrough in 1974 by producing 640 megagrams (705 tons) of reactor-grade heavy water. This represented a capacity factor of 75.5 per cent. The output, exceeding expectations, is partly attributable to a reliable supply of steam from the Douglas Point nuclear plant and the oil-fired auxiliary steam plant.

Exchange of power between Ontario Hydro and interconnected utility systems continued to provide mutual benefits. A new export licence, valid from January 1974 to the end of December 1975, permitted sales of power up to 8,250 million kWh in any consecutive 12-month period. Secondary export sales for 1974 were 5,939 million kWh and occurred mainly during the oil crisis in the first half of the year. Net revenue from this source totalled \$55 million, benefiting Ontario customers through lower costs for power.

Lake storage conditions were generally favourable throughout the year for hydro-electric stations in the East and West systems. The annual average flows for the Niagara, St. Lawrence, and Ottawa Rivers were 18.7 per cent, 21.4 per cent, and 23.8 per cent, respectively, above their 10-year averages.

Maintaining the system

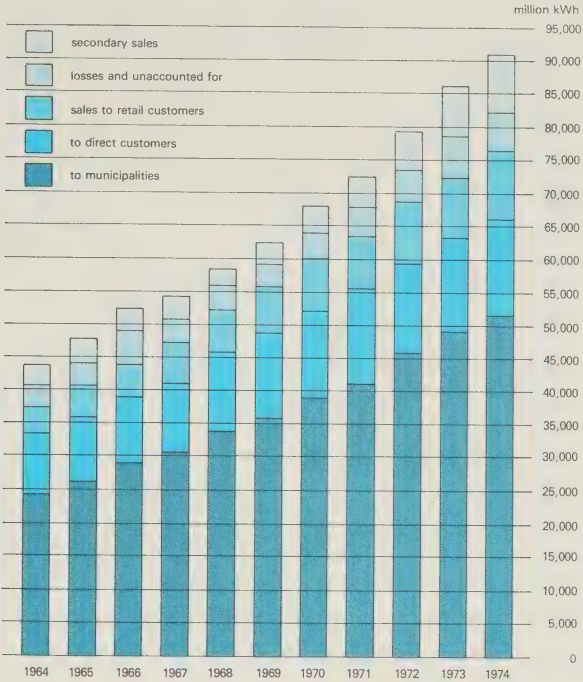
A major fire in a Nanticoke generator and tube leaks in one of Pickering's four reactors caused major maintenance problems in 1974.

The three remaining units were removed from service at Nanticoke as a precautionary measure while the cause of the fire was being investigated. Tests indicated that a metallurgical failure of an end ring on the Unit 2 generator caused the fault.

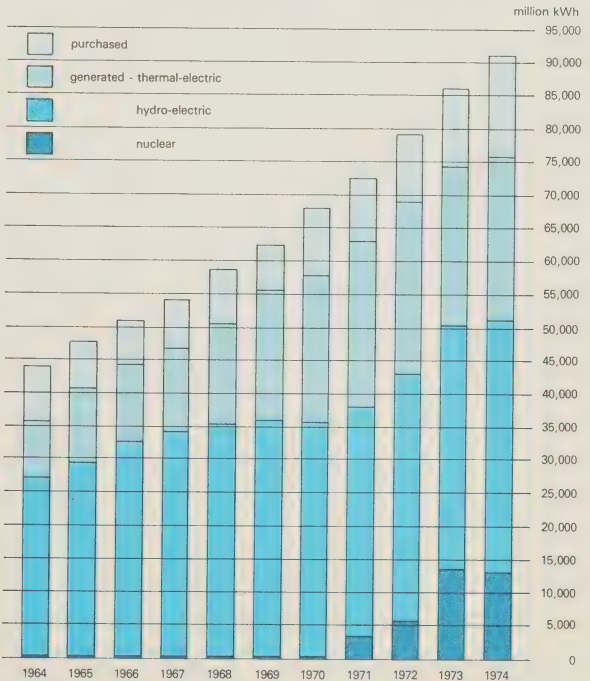
Modified end rings were installed on the other three units and they were restored to temporary service in December. Unit 2 will remain out of service for an indefinite period. New generator rotor retaining rings are being designed for all eight units to provide long-term safety and reliability.

The first Nanticoke unit came into service in 1972. Installation of units 5 to 8 should be completed by 1977 as scheduled.

Disposal of energy



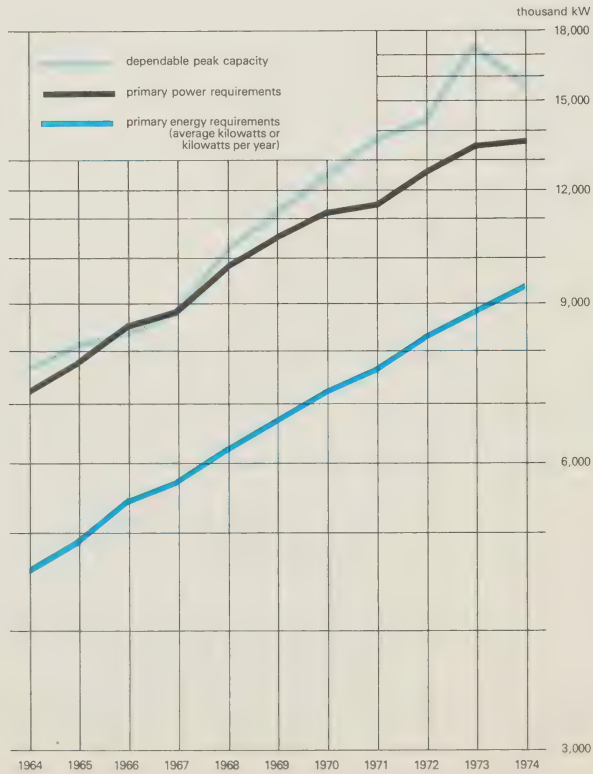
Energy made available

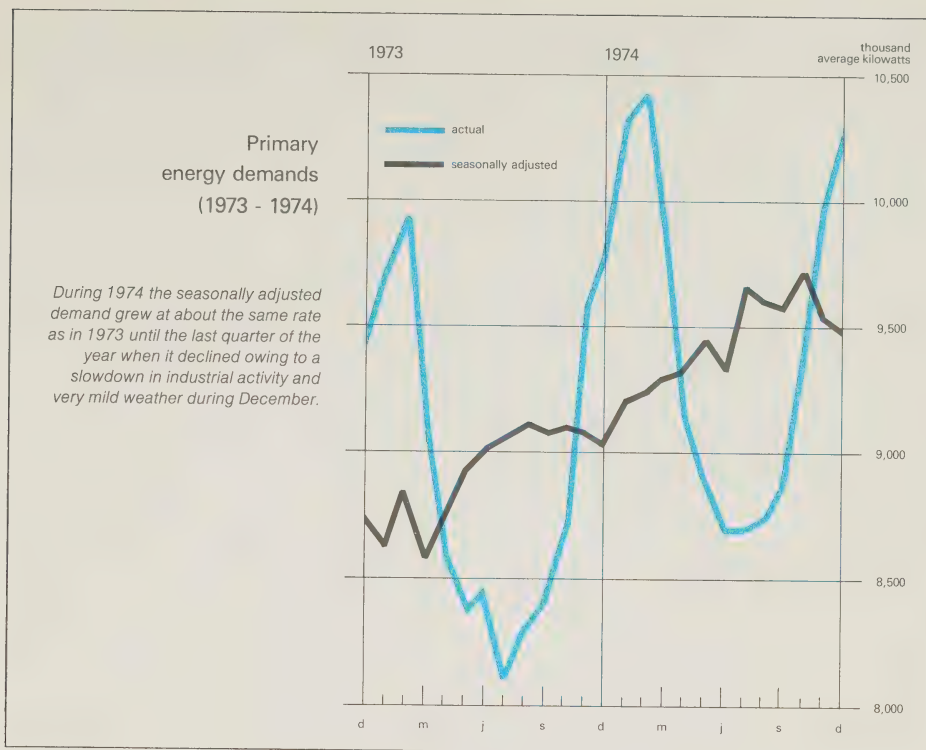


Dependable
peak capacity
of resources



Growth in demands
and resources





Discovery of pressure tube leaks in Unit 3 at Pickering last August led to an intensive investigation by Ontario Hydro, Atomic Energy of Canada Limited, and various suppliers. Pressure tubes contain heavy water which transports heat from the uranium fuel bundles inside the reactor to the steam generators. None of the heavy water escaped from the reactor system.

As a result of the investigation, sophisticated techniques were developed for detecting leaks and removing cracked tubes. A total of 17 tubes required replacement and this work was under way by year's end. The other three units continue to set high levels of performance.

To avoid a similar problem at Bruce G.S. which is under construction, plans were made to stress-relieve tubes installed in units 1 and 2, and to modify installation procedures for units 3 and 4. This will delay initial operation of unit 2 by several months, but is not expected to affect the schedule for the other three units.

During the year, Hydro continued to improve the efficiency of its operation by incorporating the latest equipment and techniques. Recent developments include:

- Delivery of a 20-axle railway car having a capacity of 500 tons to help solve the problems of shipping heavy electrical equipment.

- Acquisition of a transportable balancing machine to reduce the time and cost of balancing large steam

turbine-generator rotors during overhaul. In 1974, the machine was used to balance five rotors, of which the largest weighed 91 tons.

- The storage at five key locations of 30 specially designed 230-kV emergency transmission towers. These structures are partly assembled and can be easily transported by road or air to any location where tower damage occurs. They can be erected by a variety of methods, including techniques that involve the use of helicopters.

- Replacement turbine propellers of a modified design were installed on two of the eight units at Chats Falls GS. When work on the remaining units is completed, the station output will be increased by 27,000 kW, an increase of more than 15 per cent.

Building the system

Projects under construction or planned for service up to 1982 will add more than 11,000,000 kW to Ontario Hydro's generating capacity.

This program was approved in principle by the Ontario Government in 1973 and reviewed by the Ontario Energy Board in 1974.

On the basis of an interim report by the Energy Board, the Government approved construction of an oil-fired plant at Wesleyville, near Port Hope, and a second nuclear plant at Pickering, each with a capacity of approximately 2,000,000 kW, and two additional heavy-water plants at Bruce.

Approval of other projects was deferred pending further studies. These included a second 3,000,000-kW nuclear station at the Bruce Nuclear Power Development and a 3,000,000-kW nuclear station on a new site near Bowmanville.

Also under consideration were a 300,000-kW extension to the coal-fired Thunder Bay generating station and construction of a new station on a site in North-western Ontario.

The Government also approved public participation studies for a new generating station site and transmission facilities on the North Channel of Lake Huron.

Current projects

-Bruce Nuclear Power Development — Several station systems were completed in 1974 and commissioned for service. These included electric systems; three standby power generators; water treatment, heating and ventilating, compressed air, fire protection, and service water systems. Four 800,000-kW units are scheduled for operation by 1979.

Ontario Hydro purchased the Bruce Heavy Water Plant in 1973 from Atomic Energy of Canada Limited and construction of a second plant with similar capacity began in 1974. Approval was given for a third heavy water plant with a fourth plant to be considered.

-Pickering GS — Preliminary construction work began for a second 2,000,000-kW nuclear station at the Pickering site. It will have four 500,000-kW units. By the end of the year a number of orders had been placed for major equipment. The first unit is scheduled for service in 1980.

-Nanticoke GS — Work continued during 1974 on installing the last four units at the coal-fired station, which will have an ultimate capacity of 4,000,000 kW. The station is expected to be completed by 1977.

-Lennox GS — By year-end, regular shipments of residual oil were arriving by unit train from Quebec City for Hydro's first oil-fired station. Work on unit 2, the first scheduled for service, was delayed by a three-month strike of electricians, but the unit was expected to be started up early in 1975. All four units at the 2,295,000-kW plant are scheduled for service by 1977.

-Wesleyville GS — Preliminary construction work began near Port Hope for construction of four 500,000-kW units designed for firing by either residual or crude oil. By the end of the year, orders had been placed for the boilers, turbine-generators, and other major equipment. The four units, totalling 2,000,000 kW, are scheduled for service in 1979 and 1980.

-Arnprior GS — Two hydro-electric units with a total capacity of 78,000 kW are scheduled for service by 1976. Contracts were awarded in 1974 for the supply of generators, transformers, and other equipment; construction of the powerhouse, headworks, main dam, and tailrace control weir; and relocation of the Canadian Pacific Railway tracks.

Transformer stations

To connect Ontario Hydro's expanding 500-kV system to the 230-kV network, single-phase autotransformers with a capacity of 750 MVA were placed in service in banks of three at the Hanmer, Essa, and Kleinburg transformer stations. These installations represent an intermediate step by Ontario Hydro and the manufacturers in developing three-phase, 750-MVA autotransformers. Two of the large three-phase units were also delivered to Nanticoke GS in 1974 and several others are on order.

During the year, two new 230-kV stations and three 115-kV stations were also placed in service. Construction continued on two 230-kV and four 115-kV stations. Additional capacity was installed at one 230-kV station and at seven 115-kV stations.

Design and procurement of switchgear equipment using sulphur hexafluoride (SF₆) as an insulating medium continued for use at 115 kV, 230 kV, and 500 kV. These units will be installed at several new transformer stations in the Toronto and Ottawa areas. The use of SF₆ equipment conserves space and permits switchgear to be installed in attractive buildings on landscaped sites.

Communications and control

Twenty-eight new microwave stations are being built in Southern Ontario to provide a communications network for line protection and control purposes for the expanding power system. A new, slim-line type of tower was selected for the project and is expected to be well accepted by the public. The first phase of the microwave system extension was placed in operation in 1974 in preparation for the start-up of Lennox GS. The other phases of the system will be ready in 1975 and 1976.

In another step to improve system security and reliability work continued on the Data Acquisition and Computing System (DACS) which will collect, process, and display at the System Control Centre data from 130 generating and transformer stations. Installation and testing of control centre hardware was completed, and the testing of sub-systems was begun. Initial service is expected in 1975.

Transmission lines

Construction of new transmission facilities is essential to deliver power from new generating stations under construction. A 500-kV system overlay will be developed to meet Ontario's requirements into the 1990s.

In July, 1974, after extensive public hearings, the Ontario Government approved the route of a new 500-kV transmission corridor to connect the Nanticoke and Pickering stations together with a 500-kV line from Bruce GS to a new transformer station at Milton, where the two lines will connect. These lines are scheduled for completion in the fall of 1977.

The Nanticoke-Pickering line will follow the government's proposed parkway belt around Metropolitan Toronto as closely as possible. Acquisition of certain sections of the right-of-way is proceeding in advance of final parkway belt approval because of the urgency of getting the new facilities into service.



Landscape architect uses site photographs to assess the visual impact of proposed transmission line.

Additional 500-kV lines are required to transmit power from the Bruce project but approval has been withheld pending public hearings on long-range planning.

In addition, the route for the 500-kV line from Lennox GS to the Oshawa area awaits a decision of the Solandt Commission appointed by the Government to conduct public hearings. The decision is expected early in 1975. The line is required for service in January, 1978.

Following environmental studies, consultants produced an interim report on alternative 500-kV power corridors between Nanticoke GS and the London area. Proposals were made in September and presented to government ministries, but further action was halted pending a review of the system plan for southern Ontario.

Public participation studies have been conducted to determine the best method of transmitting power to Prince Edward County. A recommendation will be made to the Government after completion of a formal report early in 1975.

With the co-operation of the National Energy Board and the oil and gas pipeline industries, specifications have been prepared for the safe joint use of power transmission rights-of-way with oil and gas pipelines. Such multiple use of right-of-way will reduce the amount of land needed by the energy industry and save money for the utilities involved, and, ultimately, their customers.

During 1974 two sections of 500-kV transmission line between Nobel TS and Essa TS, and between Hanmer TS and Martindale Junction — a total of 75 miles — were completed. These were the final links in a second 500-kV line from Sudbury to the Toronto area, a distance of 208 miles, permitting the transfer of increased amounts of power between southern and northeastern Ontario.

Completion of a second 230-kV transmission line from the Manitoba border to Atitokan TS, via Kenora and Dryden, permits more power to flow between Manitoba and Ontario.

Property acquisition

New and more flexible policies were established in 1974 for the acquisition of transmission-line rights-of-way. These policies were developed in response to requests from the farming community for flexible compensation and more uniform application of the Expropriations Act, and were worked out in close co-operation with farm organizations, government ministries and outside agencies.

Under the new procedures, an owner may elect either a negotiated settlement or the formal expropriation procedure. On proposed high-voltage rights-of-way an owner has a choice of either selling the land to Ontario Hydro or granting an easement in perpetuity either for a lump sum or for adjustable annual payments. As provided in the Act, compensation is

based upon market value to which may be added allowances for such factors as reasonable expenses and disturbance.

Owners who have sold land to Ontario Hydro for use as rights-of-way may lease it back for agriculture, paying a nominal annual rent of \$1 per acre plus taxes. This practice retains the use of many hundreds of acres of rights-of-way for producing food.

Research

Work on a ducted air-medium underground transmission system — in effect, a large underground pipeline in which air provides the insulating medium between conductors — has shown that the system can operate at 230 kV. Tests are now being conducted at facilities set up near Kleinburg to evaluate air and other gas-insulated, three-phase transmission systems at voltages up to 500 kV.

Another step in the quest to develop less obtrusive transmission facilities is the use of semi-conductive insulators.

Research by Ontario Hydro in co-operation with a Canadian manufacturer has made it possible to convert two transmission lines from 115-kV to 230-kV operation using existing structures. Normally, much larger towers would have been required. This use illustrates the potential of the new insulators to reduce the size of transmission structures.

The manufacturer has acquired equipment to produce 20,000 such insulators annually.

Delays in the proposed 500-kV network, occasioned by the public participation process, will reduce the stability margin in parts of the system for several years as large new generating units come into service before the lines are completed. To ease this problem, equipment using a new type of excitation stabilizing signal is being developed for Bruce GS. At Lennox GS, a new type of logic control of excitation will detect severe system disturbances and improve stability.

To determine the effectiveness of the multi-flue stack for units 1 to 4 at Nanticoke GS in dispersing gases, measurements are being made of stack emissions, wind velocity and direction, air temperatures at heights up to 6,500 feet, and concentrations of pollutants at ground level. In part of the study, York University scientists are using lidar equipment — a combination of laser and radar technology — to trace the plume of invisible gases as they move downwind.

Research is being conducted on the possibility of boiler corrosion from gases produced by the planned burning of garbage at Lakeview GS. A probe has been developed to expose samples of boiler-tube alloys to combustion gases in various parts of the boiler. After removal, the samples will be examined to determine the nature and rate of corrosion.

Because there are only limited facilities in Canada for testing large reactor heat-transport pumps, Ontario Hydro is building a specially equipped laboratory for this purpose. The laboratory, scheduled to be completed in 1976, will test pumps to ensure their reliability in operation at Hydro's nuclear stations.

Choices for the future

Long-range planning of the power system is necessary to assure the orderly and timely development of appropriate facilities beyond the requirements of the next decade. Longer lead times between the conception and completion of major facilities, due in part to social, environmental, and economic considerations, have been intensifying the need for longer-term direction.

Ontario Hydro has prepared a report, "Long-Range Planning of the Electric Power System," suggesting the general direction in which the Corporation may be required to proceed over the decade ending in 1993. Made public by the Minister of Energy in July, the report develops conceptual plans for facilities needed to meet a range of rates of load growth.

The Minister of Energy released the report with the announcement that extensive public hearings on the plans would be held during 1975. Hydro placed advertisements in newspapers across the province inviting the public to comment on the report and more than 14,000 copies were distributed to individuals, citizens' groups, and organizations.

"As long as the tentative nature of the utility's long-range plan is recognized," the report emphasized, "the plan can be of value to governments, action groups, and members of the public, in providing them with a context within which to evaluate short-range plans announced by the utility."

System expansion over the next 20 years and beyond will emphasize nuclear-electric generation which is considered to be the most feasible power source from both the environmental and cost points of view.

Ontario is dependent on outside sources for 80 per cent of its energy fuels and the availability of coal, oil, and gas in the future is in question. Rapidly rising costs of these fuels are also a matter of concern. The province is rich in uranium reserves.

Nuclear power is also the most economical. Including fixed charges, it costs about 6.5 mills to produce one kilowatt-hour at the Pickering nuclear plant. At Nanticoke, a coal-burning plant of similar vintage, the corresponding cost is about 50 per cent higher.

And of all available forms of thermal-electric generation, nuclear is considered to be the best environmental option.

In the light of these advantages, Hydro is proposing, subject to the consent of government and the public, to build a system that by 1990 will be 45 per cent nuclear-fuelled and 44 per cent fossil-fuelled, with the remaining 11 per cent derived from its hydro-electric resources.

Public participation

Public involvement in all major expansion plans impacting on the environment or life style of the people has become the accepted way of doing things at Ontario Hydro and the process was associated with many expansion projects during the year.

Proposed generating station sites and high-voltage transmission line projects all involve extensive public



Analysis of boiler feedwater for corrosion products—part of research to support system design, operation, and maintenance.

involvement at the planning stage and procedures have been developed with a view to ensuring maximum public participation.

A project team approach is being used in which representatives of such Hydro functions as engineering, system planning, property acquisition, forestry, and public relations are assigned to a specific project.

The team's task is to provide the public with full information about Hydro's plans and to make any revisions to the original proposal that might be indicated on the basis of public input.

The process involves compiling extensive inventories of the study area, including information on topography, geology, soils, surface water, vegetation, wildlife, existing and future land uses, and other factors possibly bearing on the selection of a right-of-way or a station site.

Throughout the public participation process, citizens are kept informed of the study's progress through meetings, local media, and mailed reports. Only after all the data has been reviewed is the most acceptable route or site identified and recommended for approval by the Government.

Rate hearings

The Ontario Energy Board Act requires all rate changes proposed by Ontario Hydro for municipal electric utilities and direct industrial customers on or after January 1, 1975, to be submitted to the Ontario Energy Board for public review.

Public hearings into 1975 rates began last year following prior hearings and detailed public scrutiny by the Energy Board of Ontario Hydro's expansion

plans, load forecasting methods, and its financial policies and objectives. The hearings extended over a period of seven months and produced more than 13,600 pages of transcript.

At the rate hearings, Hydro proposed to increase revenues by about \$115 million by raising rates 15.3 per cent to municipal electric utilities and 16 per cent to direct industrial customers. The proposal dealt only with bulk power rates and did not deal directly with rate increases to Ontario Hydro's rural retail customers.

The Energy Board's recommendation to the Minister of Energy was that rates be increased to the municipalities and direct industrial customers by 12.7 per cent and 14.5 per cent, respectively.

Although the Board of Directors accepted the major rate recommendations made by the Energy Board, it decided that recovery of deficits from industrial customers and the retail system should begin in 1975 as originally proposed. As a result, the final rate increases announced averaged 12.4 per cent to municipalities and 15.2 per cent to direct industrial customers, effective January 1, 1975. Ontario Hydro also undertook a number of studies, many of which were suggested by the Energy Board, in an attempt to reach more definitive conclusions on related issues.

Retail rates and services

During 1974, 287 of the municipal electric utilities increased their rates. These changes increased billings to customers of the municipal systems by an estimated 6.3 per cent, on the average. This compares with a 12.7 per cent increase in the Statistics Canada index for household operation, which includes costs of fuel and energy.

In 1974 spending by the municipal electric utilities on new distribution facilities and improvements exceeded \$100 million for the first time. Although normal load growth caused part of this rise, inflation had a significant impact. To finance the cost of facilities, borrowing through debentures or bank loans increased by 64 per cent over 1973. Despite this marked increase in debt financing, the municipal utilities financed approximately 83 per cent of their new capital expenditures from operating revenues.

While rural retail rates were not within the scope of the Ontario Energy Board's deliberations, application of the same wholesale cost principles to their rates resulted in rate increases of 11.27 per cent to rural customers and 13.7 per cent to local system customers.

A new monthly payment plan was introduced for the convenience of rural customers. Under the plan, customers are billed monthly and meters read quarterly. The plan will be made available to almost all rural customers by the end of 1975.

Supplies

Purchase orders reached a record high of \$1.5 billion in 1974. Of this amount nearly \$1 billion was ordered in Canada. Of the Canadian orders \$733.7 million were placed in Ontario

Generators, turbines, boilers, and auxiliary plant equipment were included in the major category, accounting for \$448.8 million or 29.8 per cent of the total. Next came fuel at \$215.4 million or 14.3 per cent, compared with \$146.6 million in 1973.

Business arising out of these projects will create a significant workload for manufacturers and service industries.

Shortages of materials and equipment led to extended delivery times during the year. As a result, delays occurred in providing electrical service to customers early in the year in some areas.

Prices for most products continued to escalate, reflecting worldwide inflationary trends. In the fuel supply program, coal was hardest hit by price increases with the delivered cost rising 55 per cent over 1973.

To meet fuel requirements projected for the fossil stations, a major program has been undertaken to develop coal supplies from Western Canada as an alternative to U.S. sources. Canadian coal is expected to cost 50 per cent more than current U.S. supplies, and tests indicate blending of Canadian and U.S. coal will be necessary. Some delays are expected in opening up this new potential source of supply. But it is hoped that the first major shipments of Western Canadian coal will commence in late 1977 with volume reaching about four million tons annually by 1980. Negotiations for transportation and handling through a Thunder Bay terminal are under way.

Hydro signed a 30-year contract in early 1974 for the entire output of a Pennsylvania coal mine, averaging 3,000,000 tons a year. Deliveries are scheduled to begin late in 1976.

Conserving energy

Ontario Hydro continued to strengthen its marketing and research programs to help customers to use electricity wisely, efficiently, and safely.

A kit providing a package of energy conservation information for use by associated municipal utilities in newspaper advertising, direct mail, displays, and news releases stressed the need for good judgement in residential use of both electricity and other forms of energy.

Ontario Hydro joined the Canadian Electrical Association and several fossil-fuel associations in an energy-industry brief seeking improved thermal insulation standards under the National Building Code.

Although the federal government committee responsible for the National Building Code considered their recommendations to be outside its terms of reference, it strongly recommended that a special government committee be established to develop design criteria for energy conservation in buildings. The committee also recommended that insulation standards in the Canadian Code for Residential Construction — administered by the Central Mortgage and Housing Corporation — be raised to those suggested in the joint industry brief.

Many municipal councils in Ontario have passed bylaws establishing the improved insulation standards. As well, an educational program on thermal insulation and its role in energy conservation has been presented to the building trades and municipal building inspectors.

Ontario Hydro also co-operated with segments of the electrical industry in developing performance standards for appliances. Performance standards for certification of baseboard heaters became effective in July, 1974. A performance standard for thermostats in residential electric heating systems has also been developed.

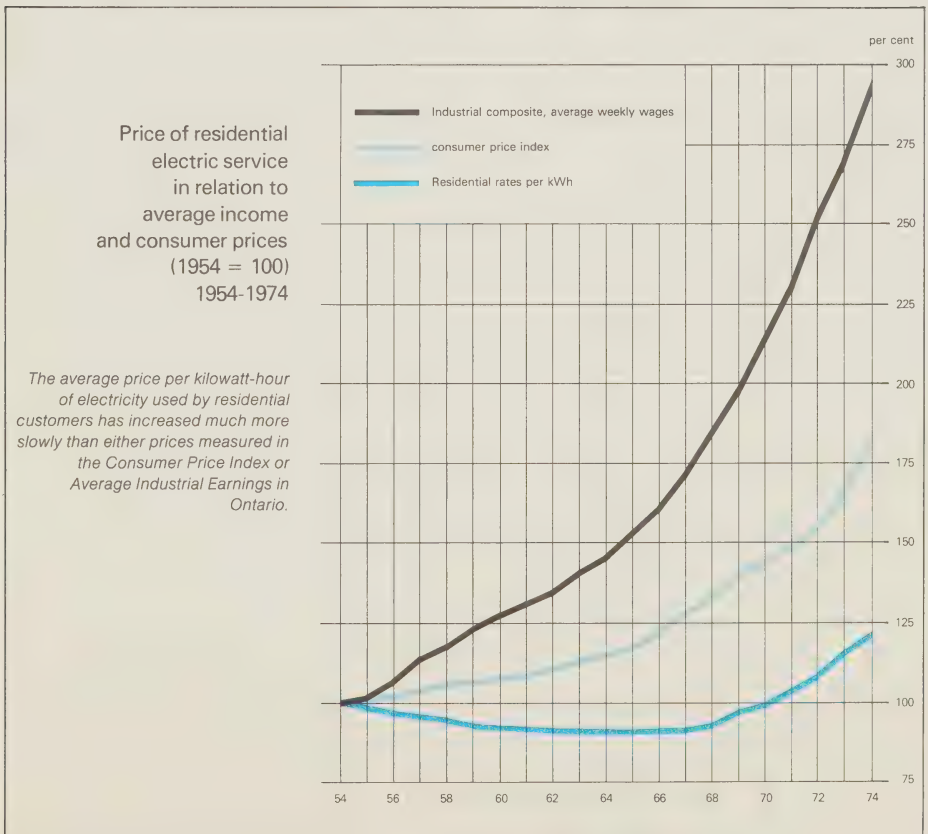
Co-operative studies continued with two major manufacturers into the performance and reliability of air-to-air residential heat pumps which offer excellent prospects for energy saving in year-round comfort conditioning applications.

Ontario Hydro also stressed energy-efficient designs for commercial and industrial applications. Computer programs were developed to help designers assess the effects of such factors as thermal insulation, ventilation methods, heat reclamation, and thermal storage. Substantial reductions in energy consumption through the use of conservation techniques were demonstrated.

During 1974, a series of energy-management seminars was held across the province for industrial customers in co-operation with the Ministry of Industry and Tourism. Participants discussed more effective management of electricity in industrial processes, including insulation, load scheduling, lighting, and heat reclamation. In co-operation with associated trades, Hydro also stressed the efficient use of electric energy on the farm, particularly in the design of ventilating systems for livestock buildings.



Ontario Hydro electrical inspectors protect users of appliances and equipment by continuous approval control.



The environment

Ontario Hydro has a wide-ranging program relating to the environment:

- The location and type of new generating stations and transmission lines will be decided only after social, ecological, and economic impacts are carefully assessed and weighed as part of the public participation process.

- More attractive transformer stations with low-profile equipment and improved-appearance towers are being installed. Landscaping will also enhance the appearance of new stations.

- Selective cutting of trees, planting of tree screens, and reforestation programs are being carried out to make transmission corridors more attractive.

- Multiple uses of transmission line rights-of-way as parks, riding and hiking trails, and recreation areas, are being encouraged.

- By 1974, nearly \$2 million had been spent on underground transmission research.

- Over the past 20 years, almost \$100 million have been spent, and much more committed, for air quality control measures at fossil-fuelled stations. In 1969, a major research program costing more than half-a-million dollars a year was begun to examine chimney emissions, control of pollutants through dispersal, treatment of fuel, and removal of pollutants from stack gases.

- By 1977 a two-year trial project is scheduled to get under way at Lakeview GS, just west of Metro Toronto, to assess the feasibility of using garbage as fuel to produce electric power. One of Lakeview's eight furnaces will be used to burn 500 tons of shredded refuse per day.

- Thermal generating stations use large amounts of water for condensing steam. The water used is returned to the lake about 15 to 20 degrees warmer than the intake temperature. To assess the effect of this warm water on large bodies of water such as the Great Lakes, Hydro is conducting extensive studies in co-operation with the Ontario Ministry of the Environment, the Ministry of Natural Resources, and the Canada Centre for Inland Waters.

Staff relations

Early in 1974, Ontario Hydro and Local 1000 of the Canadian Union of Public Employees appointed a Joint Committee on Relationships to seek ways of reducing conflict and developing a better mutual relationship. The Committee has met 35 times and produced changes in bargaining procedures. A timetable was developed for 1975 negotiations to permit concentration on major issues within agreed time limits. Security of employment and mutual protection were resolved by mid-term agreements.

In August, the Electrical Power System Construction Association (EPSCA), consisting of Ontario Hydro and 245 of its construction contractors, and the seven international craft unions, that currently comprise the Ontario Allied Construction Trade Council, signed a 10-year collective agreement. The pact,

which contains provision to reopen negotiations yearly starting in the second year, covers about one half of the construction force. At the year end, two additional unions were considering joining the Council.

The Society of Ontario Hydro Professional Engineers and Associates (SOHPEA) and Ontario Hydro signed an agreement which provides binding arbitration of disputes about salary adjustments and mediation for all other matters.

During 1974, both parties agreed to experiment for one year with final offer selection in salary negotiations. This bargaining system is designed to encourage realistic and conclusive negotiations. Failure to reach agreement leads to placing both final positions before a mediator-arbitrator, who selects the position that he considers more reasonable.

Because of the continuing rise in the cost of living, changes were planned in the amounts paid to Ontario Hydro pensioners. At the end of the year, Provincial Government approval was sought to increase by 4 per cent the pensions of employees who retired in 1973 and by 8 per cent the pensions of those who retired before 1973. All increases would be retroactive to January 1, 1974.

Staff recruitment

Extensive recruiting programs became necessary due to a shortage of skilled electrical, mechanical, and instrumentation tradesmen required to staff thermal and nuclear generating stations.

During the year, about 7,600 employees were engaged to replace former employees and to staff new activities. Nearly 1,200 students were engaged as summer employees or as part of a co-operative university-industry education program.

The demand for junior professional staff quickly absorbed employees from the graduate training program, which had an average of 45 graduates per month throughout the year.

The average number of employees on Ontario Hydro's staff was 23,612, consisting of 17,954 regular employees and 5,658 temporary and casual employees. This represented an increase of 2.8 per cent over 1973.

Staff development

The Conference and Development Centre, near Orangeville, provided training to about 5,500 persons. These included about 2,200 trades and technical employees of Ontario Hydro and 300 employees of the municipal electrical utilities. The remaining participants attended professional and management courses, seminars, conferences, and other short-term activities.

Increased emphasis was placed on diagnosing training needs, methods, and programs to meet organizational requirements. Special attention was directed to the Management Identification and Development Program, whose 124 participants are potential candidates for senior managerial positions.



This group of employees represents some of the many skills required in day-to-day activities at Ontario Hydro.

Personnel Research staff continued investigations into a wide range of areas including the variable hours experiment, safety programs, and surveys of attitudes and opinions of both management and performance-paid staff in regard to work satisfaction and job rating.

Further projects included study of human factors in the design of control rooms; methods for selecting thermal, nuclear, and maintenance personnel; and an evaluation of the effectiveness of current supervisory programs.

Health and Safety

Ontario Hydro's safety programs emphasize the protection of employees against such industrial hazards as noise, dust, toxic gases, and chemicals. As well, programs are conducted throughout the province to stress safety off the job.

During 1974 Hydro co-operated with the Ontario Ministry of Health in establishing The Contingency Plan for Pickering nuclear power station. Environmental monitoring and bioassay programs at nuclear stations are continuing efforts to protect the public and employees against radiation hazards.

Improved communications systems and new types of protective clothing for employees are being developed and tested at nuclear stations.

Three electrical safety films have been produced in co-operation with two Ontario safety associations. Another in production deals with fire fighting near "live" electrical equipment.

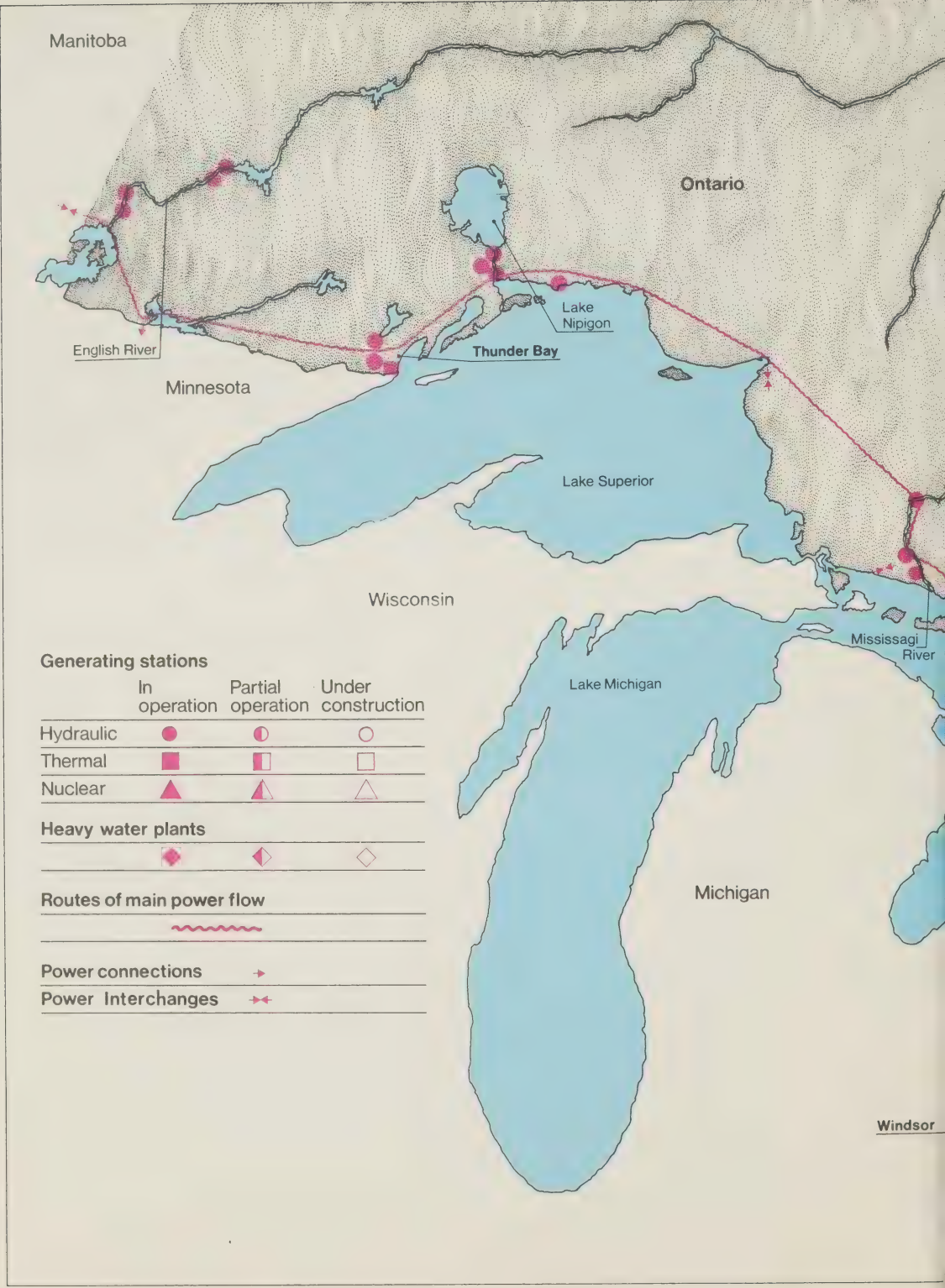
New head office

Construction of the new head office building at the corner of College Street and University Avenue, Toronto proceeded on schedule.

Occupancy of the building is expected to begin in August 1975. Plans for moving are virtually complete.

When the move is completed, all downtown office staff, now dispersed in eight locations, will be accommodated efficiently in one central location.

Variable working hours for head office employees were introduced last June to help relieve congestion in public transit and road traffic in downtown Toronto.





Comparative statistics

	1974	1973	1972	1969	1964
Dependable peak capacity ('000 kW).....	15,758	17,501	14,422	11,242	7,776
Primary peak demand ('000 kW).....	13,538	13,606	12,739	10,555	7,210
Primary energy made available ('000,000 kWh).....	82,696	78,163	73,497	59,426	40,632
Primary energy sales ('000,000 kWh)					
Municipalities.....	51,600*	49,340	45,950	36,127	24,316
Retail.....	10,800*	9,880	9,069	6,921	4,005
Direct.....	14,850*	14,075	13,539	12,386	9,113
Total.....	77,250*	73,295	68,558	55,434	37,434
Secondary energy sales ('000,000 kWh).....	8,100*	7,745	6,478	2,980	3,681
Number of ultimate customers ('000)					
Residential.....	2,177*	2,140	2,091	1,984	1,767
Farm.....	124*	124	125	130	136
General.....	283*	273	264	230	193
Total.....	2,584*	2,537	2,480	2,344	2,096
Average annual kWh per customer					
Residential.....	8,900*	8,620	8,363	7,417	5,868
Farm.....	15,300*	14,332	13,577	11,668	8,006
General.....	199,000*	190,600	182,446	165,675	131,584
Average revenue per kWh (¢)					
Residential.....	1.76*	1.63	1.53	1.34	1.26
Farm.....	2.06*	1.87	1.78	1.78	1.78
General.....	1.24*	1.13	1.04	0.90	0.84
Miles of Line					
Transmission.....	23,282	22,920	22,325	20,037	18,826
Retail Distribution.....	54,740	54,116	53,322	51,320	49,173
Bonds issued (\$'000,000 Can.).....	700	535	556	399	140
Gross expenditures on fixed assets (\$'000,000).....	890	997	562	447	110
Revenues (\$'000,000)					
Primary power and energy.....	896	794	665	469	289
Secondary energy.....	102	62	37	7	3
Assets (\$'000,000).....	7,080	6,343	5,525	4,129	2,824
Staff, average for year.....	23,612	22,962	22,582	21,686	14,531

* Preliminary

Financial review

Total sales of electrical power and energy increased 17 per cent over 1973 to \$998 million for the year. The revenues from sales of primary power and energy were \$896 million, \$103 million or 13 per cent over 1973. The increase of \$103 million arose from increases in rates and in power and energy sales. Revenues from sales, by class of customer, were:

Class of Customer	Revenues in \$ millions 1974	Revenues in \$ millions 1973	PerCent Increase
Municipal utilities	551	506	9
Retail customers	219	178	23
Direct customers	126	109	16
	896	793	13

Sales of secondary energy in 1974 provided \$102 million revenue, \$41 million above that in 1973 due primarily to increased rates.

Total costs, excluding interest, rose from \$562 million in 1973 to \$648 million in 1974, an increase of 15 per cent. Costs of operation, maintenance, and administration were higher by \$46 million, reflecting increases in wages and salaries, prices for materials and services, and staff. Fuel costs increased by \$31 million rising to \$154 million in 1974, largely due to higher prices paid for coal. The cost of purchased power increased from \$42 million to \$61 million as a result of higher rates together with a 14 per cent increase in the amount purchased. Depreciation charged to operations in 1974 rose by \$20 million to \$129 million. There was no charge for frequency standardization in 1974 as these costs were fully amortized at the end of 1973.

Interest expense increased in 1974 by \$30 million to \$223 million. Higher levels of borrowing through new bond issues and short-term notes, together with higher interest rates on new borrowings, contributed to this 16 per cent increase in interest costs.

The net income before appropriations increased by \$26 million to \$126 million in 1974. The amount appropriated for debt retirement increased by \$8 million and for the stabilization of rates and contingencies by \$18 million.

The cost of fixed assets in service and under construction grew during 1974 by \$866 million to a total of \$7,447 million. Major expenditures included \$612 million for generation facilities and \$132 million for transformation and transmission facilities. Expenditures were \$231 million at Bruce GS, \$138 million at Lennox GS, and \$89 million at Nanticoke GS. At December 31, 1974 the cost of fixed assets in service and the accumulated depreciation were:

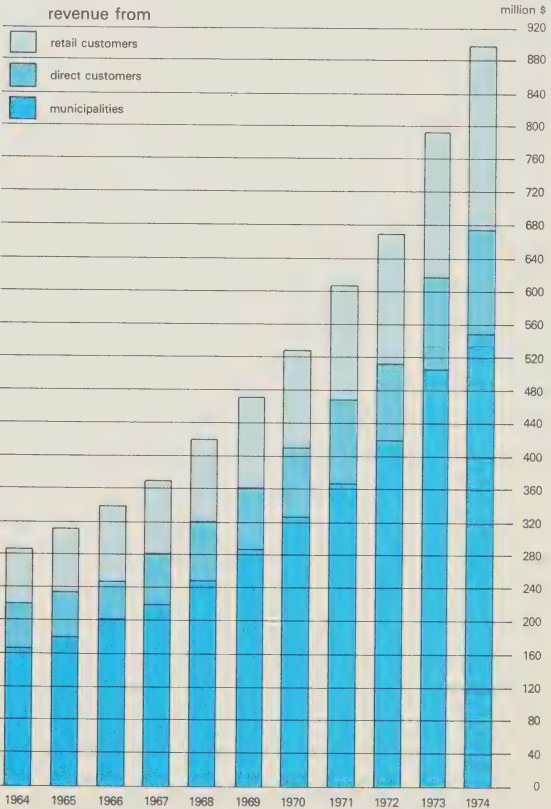
Asset Classification	In-Service Cost \$ million	Accumulated Depreciation \$ million
Generation facilities	3,346	533
Transformation and transmission facilities	1,433	290
Retail distribution facilities	561	175
Heavy water production facilities	256	19
Administration and service facilities	185	76
Total	5,781	1,093

There were six bond issues during 1974 for a total of \$700 million, including \$23 million which was delivered in January 1975. Four issues in Canadian currency, with maturities of up to 25 years, totalled \$400 million. Two issues in United States currency, with 30-year maturities, totalled \$300 million. The average coupon interest rate of 1974 issues was 9.5 per cent as compared to an average in 1973 of 8.0 per cent. Bonds retired amounted to \$160 million. The level of short-term financing during the year increased, with the balance of \$250 million at year end being \$71 million greater than at the end of 1973.

Other significant changes in the financial position were the decrease of cash and investments by \$81 million to \$306 million; increases in inventories of fuel, materials, and supplies by \$64 million to \$216 million; and increases in accounts payable and accrued charges by \$19 million to \$225 million. Total equity increased to \$1,472 million by the appropriation of \$126 million from net income.

Funds provided from operations during 1974 increased by \$19 million to \$271 million. Financing provided a net of \$659 million in 1974, an increase of \$179 million over the comparable amount for 1973. The major applications of funds were for expenditures of \$878 million on fixed assets and increases of \$64 million in inventories.

Revenues from sales of primary power and energy



Summary of Significant Accounting Policies

Fixed assets

Fixed assets include power supply facilities (generation, transformation, transmission and distribution); administration facilities (land, buildings, office and service equipment); and heavy water production facilities. The cost of additions and replacement of component units is capitalized. The cost of fixed assets retired, less the proceeds from sales, is charged to accumulated depreciation with no gain or loss being reflected in operations. Cost includes direct material and labour, and overhead costs such as engineering, administration and procurement that are considered applicable to the capital construction program. Interest is capitalized on construction costs based on the preceding three-year average of the cost of long-term funds borrowed.

The cost of producing heavy water includes direct costs, applicable overheads, interest and depreciation. The total cost of heavy water produced and purchased is capitalized as part of generation facilities.

Depreciation

Since January 1, 1971, all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates for the various classes of assets are based on the estimated service lives, which are subject to periodic review. The service lives of major asset classes are:

Generation—Hydro-electric	50 to 100 years
Generation—Thermal-electric	30 years
Transmission and distribution	25 to 50 years
Heavy water production facilities	20 years

Nuclear agreement—Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Com-

mencing with the in-service date of each of these units in 1971, Ontario Hydro is required to make payments for 30 years to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Appropriations from net income

Under the provisions of the Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for stabilization of rates and contingencies is the amount retained to stabilize the effect of abnormal cost fluctuations.

Foreign currency translation

The liability for bonds payable in foreign currencies is translated to Canadian currency at the rates of exchange at time of issue. When bonds are retired, exchange losses or gains are charged or credited to interest expense in the statement of operations.

Translated at the rates of exchange at December 31, 1974, the total Canadian dollar liability for bonds payable in foreign currencies would be increased by \$17 million.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, benefit-based plan covering all regular employees of Ontario Hydro. The most recent actuarial valuation of the plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million will be amortized over the years 1974 to 1978 and the balance of \$19 million will be amortized over the years 1974 to 1989.

The pension costs for each year include current service costs and the pro rata share of the amount required to amortize the unfunded obligation.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1974 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations, and changes in financial position for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1974 and the results of its operations and the changes in its financial position for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 10, 1975

CLARKSON, GORDON & CO.
Chartered Accountants

Statement of Operations
for the year ended December 31, 1974

	1974 \$'000	1973 \$'000
Revenues		
Primary power and energy.....	896,270	793,654
Secondary power and energy	101,506	61,801
	997,776	855,455
Costs		
Operation, maintenance, and administration	288,360	242,232
Fuel used for electric generation.....	154,037	123,534
Power purchased.....	60,699	41,746
Nuclear agreement—payback.....	15,708	17,560
Depreciation (note 1)	129,353	108,873
Amortization of frequency standardization	—	28,265
	648,157	562,210
Income before interest	349,619	293,245
Interest (note 2)	223,410	192,779
Net income	126,209	100,466
Amounts appropriated for:		
Debt retirement	73,184	65,688
Stabilization of rates and contingencies	53,025	34,778
	126,209	100,466

See accompanying summary of significant accounting policies and notes to financial statements.

**Statement of Financial Position
as at December 31, 1974**

Assets

Fixed assets

	1974 \$'000	1973 \$'000
Fixed assets in service, at cost.....	5,780,942	5,499,616
Less accumulated depreciation	1,093,272	958,796
	4,687,670	4,540,820
Fixed assets under construction, at cost	1,665,829	1,081,281
	<u>6,353,499</u>	<u>5,622,101</u>

Current assets

Cash and short-term investments (note 3).....	77,046	156,234
Accounts receivable.....	129,962	117,994
Fuel for electric generation, at cost.....	158,813	119,778
Materials and supplies, at cost.....	57,285	32,770
	<u>423,106</u>	<u>426,776</u>

Other assets

Investments (note 4).....	228,710	230,911
Debt discount and expense, less amounts written off.....	47,680	44,668
Investment in coal supply (note 5).....	6,711	—
Long-term accounts receivable and other assets.....	20,583	18,710
	<u>303,684</u>	<u>294,289</u>
	<u>7,080,289</u>	<u>6,343,166</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Liabilities

Long-term debt

	1974 \$'000	1973 \$'000
Bonds payable (note 9)	4,782,514	4,271,924
Plant purchase agreement (note 6)	245,900	250,135
	5,028,414	4,522,059
Less payable within one year	118,560	112,886
	4,909,854	4,409,173

Current liabilities

Accounts payable and accrued charges	225,084	205,842
Notes payable	249,985	178,800
Accrued interest	104,876	90,619
Long-term debt payable within one year	118,560	112,886
	698,505	588,147

Equity

Equities accumulated through debt retirement appropriations	1,015,725	942,586
Reserve for stabilization of rates and contingencies	329,510	276,565
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	1,471,930	1,345,846
	7,080,289	6,343,166

On behalf of the Board



Chairman



President

**Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1974**

Balances at beginning of year.....	
Appropriated from net income	
Refund of prior years' debt retirement appropriations (note 7).....	
Grant to Ontario Municipal Electric Association.....	
Balances at end of year	

**Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1974**

Balances at beginning of year.....	
Add:	
Debt retirement appropriated from net income	
Annexation transfers and refunds.....	
Balances at end of year	

See accompanying summary of significant accounting policies and notes to financial statements.

Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
	Municipalities	Direct Customers	Retail Customers	1974	1973
\$ '000	\$ '000	\$ '000	\$ '000	\$ '000	\$ '000
306,273	1,144	(10,911)	(19,941)	276,565	249,186
53,053	80	(12)	(96)	53,025	34,778
—	—	—	—	—	(7,329)
—	(80)	—	—	(80)	(70)
359,326	1,144	(10,923)	(20,037)	329,510	276,565

Municipalities	Power District (Retail and Direct Customers)	Totals	
		1974	1973
\$ '000	\$ '000	\$ '000	\$ '000
658,204	284,382	942,586	876,900
47,713	25,471	73,184	65,688
81	(126)	(45)	(2)
705,998	309,727	1,015,725	942,586

**Statement of Changes in Financial Position
for the year ended December 31, 1974**

	1974 \$'000	1973 \$'000
Source of funds		
Operations		
Net income	126,209	100,466
Add charges not requiring funds in the current year		
Depreciation (note 1)	142,456	121,305
Amortization of frequency standardization, less interest on the account	—	27,665
Other items—net	2,361	2,863
	<u>271,026</u>	<u>252,299</u>
Financing		
Bonds issued	670,156	528,705
Debt incurred on purchase of heavy water plant	—	253,000
Less retirements	(163,801)	(125,493)
	506,355	656,212
Increase in notes	71,185	26,383
Decrease in cash and investments	81,389	50,339
	<u>658,929</u>	<u>732,934</u>
Increases in accounts and interest payable	33,499	37,139
	<u>963,454</u>	<u>1,022,372</u>
Application of funds		
Net additions to fixed assets (1973 includes heavy water plant for \$253 million)	873,854	988,490
Increases in fuel, materials and supplies	63,550	15,891
Increase in accounts receivable and other assets	20,552	8,494
Refund of prior years' debt retirement appropriations (note 7)	—	7,329
Other items—net	5,498	2,168
	<u>963,454</u>	<u>1,022,372</u>

See accompanying summary of significant accounting policies and notes to financial statements:

Notes to financial statements

1. Depreciation

Depreciation consisted of:

	1974 \$'000	1973 \$'000
Power supply facilities—charged directly to operations	129,353	108,873
Administration and service facilities—charged indirectly to operations	13,103	12,432
Total charged to operations	142,456	121,305
Heavy water production facilities—charged to cost of heavy water	12,714	6,325
	<u>155,170</u>	<u>127,630</u>

2. Interest

Interest costs consisted of:

	1974 \$'000	1973 \$'000
Interest on bonds, notes and plant purchase agreement	362,145	298,441
Less:		
Interest capitalized	84,806	64,420
Interest on heavy water production facilities—charged to cost of heavy water	18,177	10,020
Interest earned on investments	32,111	28,403
Net profit on redemption of bonds and sale of investments	3,641	2,219
Interest on unamortized frequency standardization cost	—	600
	<u>138,735</u>	<u>105,662</u>
	<u>223,410</u>	<u>192,779</u>

3. Cash and short-term investments

Cash and short-term investments, with short-term investments recorded at cost (approximately market value), consisted of:

	1974 \$'000	1973 \$'000
Cash	7,938	2,799
Notes of, and interest bearing deposits with, banks and trust companies	35,011	123,475
Government and government-guaranteed bonds ...	27,140	19,853
Corporate bonds and notes	6,957	10,107
	<u>77,046</u>	<u>156,234</u>

4. Investments

These investments, with maturities beyond one year, are recorded at amortized cost and consisted of:

	1974 \$'000	1973 \$'000
Government and government-guaranteed bonds ...	194,442	207,915
Corporate bonds and notes	34,268	22,996
	<u>228,710</u>	<u>230,911</u>

Market value of these investments at December 31, 1974 was \$208 million (1973-\$209 million).

5. Investment in coal supply

Ontario Hydro and United States Steel Corporation have entered into an agreement for the development of a coal mine owned by United States Steel Corporation for the supply of 90 million tons of coal to Ontario Hydro over a thirty-year period commencing in 1976. Ontario Hydro will advance up to \$38 million for mine development and equipment, and will guarantee

lease payments for mine equipment and rolling stock leased by United States Steel Corporation and make subsequent advances for a portion of the cost of equipment replacements. These advances and associated costs are to be amortized as part of the cost of the coal purchased under this agreement.

6. Plant purchase agreement

The Bruce Heavy Water Plant was purchased from Atomic Energy of Canada Limited in 1973. Under the agreement, Ontario Hydro pays Atomic Energy of Canada Limited equal monthly instalments of blended principal and interest from July 28, 1973 to December 28, 1992, with an interest rate of 7.795%. Principal repayments over the next five years will total \$39 million.

7. Reserve for stabilization of rates and contingencies

During the period from 1935 to 1949, appropriations for debt retirement charged to the direct industrial customers of the former Northern Ontario Properties were made at rates higher than those for customers in the former Southern Ontario System. On amalgamation of the two systems in 1962, the excess appropriation was determined and segregated in the Reserve as held for the benefit of these customers of the former Northern Ontario Properties. In 1973 a refund of \$7,329,000 was made to those direct customers still in existence.

8. Reclassification of 1973 comparative figures

In the Statement of Financial Position the amounts shown in 1973 as deferred liabilities have been included with accounts payable and accrued charges. Long-term accounts receivable and other assets have been grouped as one item.

9. Bonds payable

Summary - Canadian \$

	1974 \$'000	1973 \$'000
Canadian issues	3,028,634	2,778,399
United States issues	1,555,564	1,295,209
West German issues	137,109	137,109
Eurodollar issue	35,295	35,295
Swiss issue	25,912	25,912
	<u>4,782,514</u>	<u>4,271,924</u>
Maturities at December 31, 1974		Can \$'000
1975		111,960
1976		170,910
1977		135,982
1978		218,765
1979		148,270
1975-1979		<u>785,887</u>
1980-1984		728,809
1985-1989		358,340
1990-1994		381,295
1995-1999		1,668,312
2000-2004		859,871
		<u>4,782,514</u>

9. Bonds payable (cont'd)
Details of issues outstanding
Payable in Canadian currency (1)

Maturity	Callable	Year of Issue	Interest Rate %	Principal Outstanding December 31, 1974 Can \$'000	Maturity	Callable	Year of Issue	Interest Rate %	Principal Outstanding December 31, 1974 Can \$'000
Feb. 1975	—	1970	9.00	40,619	Jan. 1988	1984	1966	5.75	47,856
Aug. 1975	1972	1957	4.75	30,464	Apr. 1988	1984	1966	6.00	46,777
Jan. 1976	1974	1956	4.00	43,347	July 1988	1984	1966	6.00	43,977
Sept. 1976	—	(2) 1970	8.50	74,975	Jan. 1989	1985	1967	6.25	37,874
Oct. 1976	—	1969	8.25	13,949	Sept. 1989	1985	1967	6.50	27,426
Nov. 1976	1974	1957	5.00	34,599	Mar. 1990	1986	1967	6.00	44,727
Jan. 1977	1975	1967	6.25	14,810	Apr. 1992	1988	1968	7.00	39,920
Mar. 1977	1975	1955	3.50	38,114	Aug. 1992	1988	1968	7.00	43,265
Apr. 1977	1974	1957	5.00	72,444	Sept. 1992	1988	1968	7.00	56,217
Feb. 1978	—	1972	6.25	30,000	Mar. 1994	1989	1969	7.75	27,262
Mar. 1978	1976	1958	4.50	32,627	Apr. 1994	1990	1970	9.00	46,527
Aug. 1978	—	1973	8.25	30,000	May 1994	1989	1969	7.75	30,754
Oct. 1978	1976	1958	5.00	45,508	Oct. 1994	1989	1969	8.25	23,415
Nov. 1978	—	1973	8.25	25,000	Dec. 1994	1989	1969	8.50	20,888
Mar. 1979	—	1974	8.00	25,000	Feb. 1995	1990	1970	9.00	9,281
May 1979	1974	1954	3.50	34,492	June 1995	1990	1970	9.00	57,770
July 1979	—	1959	5.75	28,812	Nov. 1995	1990	1970	8.75	69,555
Oct. 1979	1974	1954	3.50	49,352	Feb. 1996	1991	1971	7.50	86,786
Feb. 1980	1978	1960	6.00	26,355	Apr. 1996	1991	1971	7.625	52,490
July 1980	1978	1960	5.50	35,425	July 1996	1991	1971	8.25	66,119
Feb. 1981	1979	1961	5.50	39,250	Sept. 1996	1991	1971	7.875	83,898
June 1981	—	1974	9.625	25,000	Feb. 1997	1992	1972	7.375	67,775
Aug. 1981	—	1974	9.75	25,000	Apr. 1997	1992	1972	7.625	92,271
Nov. 1981	—	1974	9.375	40,000	Sept. 1997	1992	1972	8.25	93,134
June 1982	1979	1962	5.00	32,069	Feb. 1998	1993	1973	7.75	98,423
Mar. 1983	1980	1963	5.25	38,894	May 1998	1993	1973	8.00	123,000
June 1983	1979	1963	5.00	51,215	Nov. 1998	1993	1973	8.50	50,000
Aug. 1983	—	1973	8.375	45,000	Mar. 1999	1994	1974	8.50	75,000
Nov. 1983	1980	1961	5.25	39,812	June 1999	1994	1974	9.75	75,000
Feb. 1984	1981	1964	5.25	49,689	Aug. 1999	1994	1974	10.25	75,000
Oct. 1984	1980	1964	5.25	53,157	Nov. 1999	1994	1974	10.00	60,000
Feb. 1985	1981	1965	5.25	67,546					
July 1987	1985	1967	6.25	23,723					
Total payable in Canadian currency									3,028,634

Payable in United States currency (1) Held by Province of Ontario

Maturity	Callable	Year of Issue	Interest Rate %	Principal Outstanding December 31, 1974	
				US \$'000	Can \$'000
Feb. 1975	1958	1953	3.25	37,626	36,837
Nov. 1978	1958	(3) 1953	3.625	46,097	45,016
Mar. 1980	1959	(3) 1954	3.125	28,886	28,189
May 1981	1961	(3) 1956	3.875	40,501	39,769
Feb. 1984	1969	(3) 1959	4.75	66,783	64,751
Sept. 1990	1975	(3) 1965	4.75	44,896	48,319
April 1996	1981	(3) 1966	5.50	32,127	34,637
April 1997	1982	(3) 1967	5.625	59,249	64,119
Dec. 1997	1982	(3) 1967	6.875	70,530	76,261
Aug. 1998	1983	(3) 1968	7.125	70,680	75,848
Feb. 1999	1984	(3) 1969	7.375	73,830	79,321
Sept. 1999	1984	(3) 1969	8.325	95,215	102,624
Feb. 2000	1985	(3) 1970	9.25	98,720	105,877
Aug. 2000	1985	(3) 1970	9.25	73,435	74,906
May 2001	1986	(3) 1971	7.85	89,650	90,525
May 2002	1987	(3) 1972	7.70	99,145	98,154
Dec. 2002	1987	(3) 1972	7.30	95,550	95,216
Oct. 2003	1988	(3) 1973	7.90	125,000	125,038
Mar. 2004	1989	(3) 1974	8.60	125,000	121,325
Oct. 2004	1989	(3) 1974	10.25	175,000	171,821
				1,547,920	1,578,553
Deduct portion of issue dated October 1, 2004 delivered in January 1975				23,100	22,989
Total payable in United States currency				1,524,820	1,555,564

				Principal Outstanding December 31, 1974	
Maturity	Callable	Year of Issue	Interest Rate %		
Payable in West German currency (1)				DM'000	Can \$'000
Aug. 1975-1984	1975	(3,4) 1969	7.00	150,000	40,401
Dec. 1977-1986	1977	(3,4) 1971	7.50	100,000	30,445
June 1980-1987	1980	(4,5) 1972	6.50	100,000	30,783
Mar. 1981-1988	1981	(4,5) 1973	6.50	100,000	35,480
Total payable in West German currency				450,000	137,109
Eurodollar-payable in United States currency (1)				US \$'000	Can \$'000
Jan. 1977-1986	1977	(3,4) 1971	8.25	35,000	35,295
Payable in Swiss currency (1)				Sw Fr '000	Can \$'000
Oct. 1983-1987	1983	(3,6) 1972	5.50	100,000	25,912

- (1) Bonds payable in United States currency, held by the Province of Ontario, have terms identical with issues sold in the United States by the Province on behalf of Ontario Hydro. All other bonds payable are guaranteed as to principal and interest by the Province of Ontario.
- (2) Exchangeable at bondholder's option for an equal amount of bonds due September 1996 at 8.25% interest.
- (3) Callable at various declining premiums.
- (4) Payable in equal annual installments.
- (5) Callable for 3 years at 101% and thereafter at par.
- (6) Redeemable 1983-1986, by purchase in the market, of up to 10,000,000 Sw Fr annually, at prices not exceeding par.

Pension and Insurance Fund Statement of Assets as at December 31, 1974

	1974 \$'000	1973 \$'000
Investments		
Government and government-guaranteed bonds.....	145,660	146,832
Corporate bonds.....	74,279	56,849
Corporate shares.....	158,529	119,232
Total bonds and shares.....	378,468	322,913
First mortgages.....	133,685	100,756
Term deposits and notes with banks.....	3,000	25,357
Total investments.....	515,153	449,026
Cash.....	187	74
Accrued interest.....	4,784	4,948
Receivable from Ontario Hydro.....	796	32
	<u>520,920</u>	<u>454,080</u>

Notes

1. The most recent actuarial valuation of the plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million will be amortized over the years 1974 to 1978 and the balance of \$19 million will be amortized over the years 1974 to 1989.

2. In the above statement of assets, bonds, deposits and notes are included at amortized cost, shares at cost, and first mortgages at balance of principal outstanding. The market value of total bonds and shares at December 31, 1974 was \$304 million (1973—\$313 million).

Auditors' Report

(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1974. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion the accompanying statement presents fairly the assets of the fund as at December 31, 1974.

Toronto, Canada,
March 10, 1975.

CLARKSON, GORDON & CO.
Chartered Accountants

Ontario Hydro's Regional Offices

Central Region
5760 Yonge St.
Willowdale, M2M 3T7
F.J. Dobson, Manager

Eastern Region
420 Dundas St. E.
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T.E. Flinn, Manager

Georgian Bay Region
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Niagara Region
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Northeastern Region
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L.A. Coles, Manager

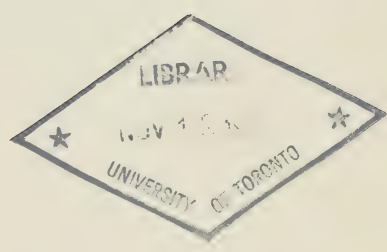
Northwestern Region
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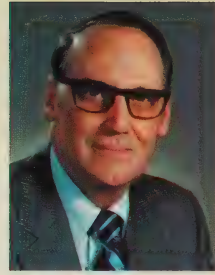
Ontario
Hydro
Annual
Report
1975

Ontario Hydro

Head Office, 700 University Avenue, Toronto, M5G 1X6



Robert B. Taylor, Chairman



D. J. Gordon, President

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William Dodge, O.C., Ottawa
Former Secretary-Treasurer
Canadian Labour Congress

D. Arthur Evans, M.P.P., Bradford
Parliamentary Assistant to the
Minister of Energy
(Retired November 12, 1975)

Andrew Frame, Burlington
Professional Engineer
(Retired January 31, 1975)

† **Douglas J. Gordon**, Toronto
President, Ontario Hydro

Robert H. Hay, Kingston
Member, Kingston Public Utilities Commission

† **Douglas G. Hugill**, Sault Ste. Marie
Tax Consultant

* **Allen T. Lambert**, Toronto
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* **Philip B. Lind**, Toronto
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† **Mrs. A. C. Pigott**, Ottawa
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Morrison Lamothe Foods

† * **Robert B. Taylor, F.C.A.**, Toronto
Chairman, Ontario Hydro

* **Robert J. Uffen, F.R.S.C.**, Kingston
Vice-Chairman, Ontario Hydro
Dean, Faculty of Applied Science,
Queen's University

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Harold A. Smith, M.B.E., F.R.S.C.
Vice-President, Engineering and Operations

William E. Raney, Q.C.
Secretary and General Counsel

† Member of the Audit Committee

* Member of the Finance Committee

Picture, above right, taken at a recent meeting of the Ontario Hydro Board shows: Front row (left to right) Jean E. Pigott, Douglas J. Gordon, Robert B. Taylor, Robert J. Uffen. Back row (left to right) William Dodge, J. Conrad Lavigne, Douglas G. Hugill, Robert H. Hay, Philip B. Lind, Allen T. Lambert, J. Dean Muncaster, William E. Raney.



Report of the Board of Directors of Ontario Hydro for the year 1975

To The Honourable Dennis Timbrell,
Minister of Energy.

The march of economic events over the past few years has led Ontario Hydro to fundamentally alter the way in which it plans for growth of the provincial power system. The availability of money has replaced forecasts of customer requirements as the paramount factor in deciding how much new capacity and lines to build. The change has profound implications for users of electrical power, and indeed for all the citizens of Ontario.

Faced with an unprecedented rate of inflation coupled with economic recession and accompanying unemployment, government at all levels has attempted to restrain public spending and achieve a return to economic stability by more carefully allocating the financial resources available to it.

In Ontario this has led to constraints being placed on the amount of borrowing Hydro may undertake to finance the expansion of the province's electrical resources under the program planned to 1985. At the same time rates have not been allowed to increase sufficiently to cover the effect of inflation on operating costs. Consequently, in 1975, the

Corporation's revenue contributed nothing towards the enlargement of its capital facilities. As a result of this situation, in February 1976, the Hydro Board approved a reduction of \$5.2 billion in expansion plans through to 1985. This was in addition to the \$1.2 billion reduction the Board had approved in July, 1975. The reduced program will be sufficient to supply a growth rate in annual customer demand of only about 6 per cent.

During the past year of financial constraints, however, there was little let-up in the demand for electrical power. You will note elsewhere in this report that peak demand for electricity in December, 1975 reached a record 14,513,000 kilowatts, 7.2 per cent higher than in the previous year. In January and again in February of 1976 that peak was exceeded.

These events illustrate why conservation of electricity has emerged as the single most important issue facing Ontario Hydro today and over the next decade. Hydro will work closely with the Ministry of Energy in developing policies to reduce the growth rate to the level required to keep capital expenditures within the constraints set by the government.

In April, 1975, the Hydro Board submitted its proposed 1976 wholesale rate increase to the Minister of Energy for reference to the Ontario Energy Board in accordance with section 37a of The Ontario Energy Board Act. The increase of almost 30

per cent was the largest ever sought and was the result of soaring fossil fuel prices, the need for internally generated capital and the prospect in 1975 of the largest deficit in Hydro's history.

It should be noted at this point that when an increase in the wholesale cost of power is reflected in actual bills to retail customers of the municipal utilities, it becomes a significantly lower figure. For example Hydro's request for a 30 per cent increase in the wholesale cost of power would have resulted in a 21 per cent increase in the retail bill of the so-called "mythical, typical residential" customer.

In July, the Provincial Treasurer brought down a supplementary budget that directed Ontario Hydro to reduce its capital expenditures by \$1 billion, reduce its administrative costs by 10 per cent and reconsider its 1976 rate increase proposal. Hydro responded by cutting \$1.2 billion from its capital program, setting a target reduction of \$50 million in its 1976 budget, and revising its 1976 proposed rate increase to 25 per cent.

In October, the Ontario Energy Board issued Part 1 of its report. It largely confirmed Hydro's position, but as a consequence of using a different approach, recommended an increase of 27 per cent instead of the 25 per cent proposed by Hydro. Three days later, the Federal government announced its anti-inflation guidelines and a week later the Hydro Board, confident that its proposal was within those guidelines, reaffirmed its decision to implement the 25 per cent wholesale rate increase in 1976. This decision was made having in mind the Corporation's statutory obligation to recover the cost of providing electricity and in the light of the Energy Board's confirmation that the increase was not out of line with rising costs. The Provincial Government then announced that a Select Committee of the Legislature would examine the 1976 rate increase proposal to ascertain whether it did indeed meet the federal anti-inflation guidelines.

Rates increased 22 per cent

In December, the Committee recommended to the Legislature an interim rate increase of 22 per cent and requested that it be permitted to continue its review in 1976. Both were approved and the Hydro Board accepted the verdict and implemented an increase of 22 per cent effective January 1, 1976.

The Hydro Board wants to record its strong support of the anti-inflation programs of the Federal Government and the Province. In fulfilling its regulatory role under the anti-inflation guidelines, Hydro will, to the best of its ability, ensure that retail rate increases proposed by the municipal utilities of Ontario meet both the intent and the spirit of the anti-inflation program.

But the people of this province and the government must accept the fact that substantial increases in Hydro rates will be necessary over the next few years. The long-term financial well-being of Ontario Hydro and its ability to serve the province must obviously be the Board's paramount concerns. Aside from

providing for the cost of goods and services that Hydro must pass through to its customers, rates should also be high enough to provide some part of the funds required to expand the system. In other words, Hydro must move to a more "pay-as-you-go" policy. While recognizing the impact of high increases on customers, the Board is convinced that they are necessary to maintain the capability of the provincial power system to withstand the financial strains that lie ahead.

Uranium is a vital commodity

The supply of fuels, principally coal and uranium, is of continuing concern to the Hydro Board. It is hoped that this concern will be relieved to a large extent by current negotiations with uranium suppliers and both the coal mining companies and the Alberta Government.

Nuclear energy remains in the forefront of Ontario Hydro's plans for the province's electrical resources. Although alternative sources such as solar energy will ultimately contribute significantly to space heating requirements, at the present time there is no practical substitute for uranium fuel in the large scale generation of electric power. While the Pickering nuclear station demonstrates daily the reliability and safety of the Canadian reactor system, some groups are pressing for a re-assessment of the nuclear power program. Ontario Hydro will continue its efforts to make information available at every opportunity so that the people of the Province and their representatives can make intelligent choices. In the view of the Board, any delay or moratorium on nuclear power would place the electricity supply of Ontario in serious jeopardy.

Choices for the future is the subject of the hearings of the Royal Commission on Electric Power Planning that began last year. The objective of the Commission's expedition into our electrical future is to produce publicly acceptable guidelines for the future course of electrical development in Ontario.

This report would not be complete without an expression of appreciation for the continuing cooperation received from the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities.

And again the Board pays tribute to the men and women of Ontario Hydro, who, in a year of extraordinary change and challenge, continued to display the skills, the judgement and the dedication that are the hallmark of the Hydro enterprise.

Finally, the Board refers you to the balance of this annual report for a more detailed view of Ontario Hydro's financial position and corporate activities during 1975.

On behalf of the Board



Robert B. Taylor, Chairman

"There was little let-up in the demand..."

Ontario Hydro, charged with ensuring an adequate supply of electrical power for the province in the years and decades ahead, moved into the last quarter of the Twentieth Century facing substantially different challenges than those of the post-World War II boom.

Throughout the Corporation's 69-year history, long-range planning had generally been based on anticipated growth in demand, but the events of 1975 caused a drastic re-alignment in the method and manner of Hydro's planning.

Hydro's priorities for planning now place availability of capital ahead of customer demand. This realignment was brought about by two principal factors: rampant inflation, not only in the cost of fuels, but in labor and construction materials, and government restraints on public borrowing. These restraints reflected both the lack of capital available and the government's requirements for borrowing on the public money market.

Throughout the year, Hydro and the 353 associated municipal electrical utilities continued to meet the growing demands of their 2,653,000 customers. In fact, on December 18—despite the economic recession and a growing conservation ethic—Hydro met the largest primary peak demand in its history—14,512,648 kilowatts, 7.2 per cent higher than its highest demand counterpart in 1974. The system readily dealt with this peak demand; dependable peak capacity was increased during the year to 18,666,900 kilowatts due largely to the placing in service of another 500,000-kilowatt unit at Nanticoke generating station.

Energy needs rose 1.8 per cent

Statistically, in 1975 Ontario's primary energy requirements climbed 1.8 per cent over 1974 to a total of 84,222 million kilowatt-hours, a lower growth rate than anticipated, primarily because of the economic slump and labor stoppages in the industrial sector. Monthly peak and energy demands were especially low during the high strike activity from July through November. However, it is noted that average energy used by residential customers continued to climb during 1975 at about the same rate as in 1974.

Export sales of interruptible power decreased from 5,939 million kilowatt-hours in 1974 to 1,996 million kilowatt-hours in 1975, due almost entirely to the recessionary climate in the United States.

During 1975, 48 per cent of the electrical energy generated came from hydro-electric plants, about 28 per cent from coal and approximately 16 per cent from nuclear, while only about 8 per cent was produced by natural gas and oil-fired plants.

Ontario Hydro burned 7,538,100 tons of coal, 1.7 per cent more than in 1974, while the 58.3 billion cubic feet of natural gas consumed represented a 6.8 per cent increase. Conversely, oil consumption by combustion turbines declined to 1,498,700 gallons, a

47.9 per cent decrease from 1974. In addition, 821,262 barrels of residual oil were burned, while uranium consumption in 1975 declined 16 per cent, to 238 tons. Production of reactor-grade heavy water totalled 605 megagrams in 1975.

While the admixture of supply continues to reflect considerable reliance on fossil fuels, Ontario Hydro—realizing that these resources are dwindling, increasing in cost and subject to interruption by jurisdictions outside of Ontario—continues to believe that nuclear power will be its primary source of future electrical generation at least for the next 25 years.

Joint exploration begun

To this end, and to ensure a secure supply of Canadian uranium, Ontario Hydro in 1975 entered into joint exploration agreements with Shell Canada Ltd. of Calgary and AMOK Limited of Saskatoon to seek new sources of uranium in Northern Ontario, Saskatchewan and the Northwest Territories. Negotiations also continued in 1975 with Canadian uranium suppliers, aimed at securing long-term contracts.

Meanwhile, Hydro is still awaiting the announcement of the Alberta Government's coal policy that is expected to result in a licence for Luscar Coal Limited of Calgary. First shipments of 2 million tons under this agreement with Hydro are expected to commence in 1977 and total Western coal shipments are expected to reach 4 million tons annually by 1980. The development of terminal and transportation facilities through Thunder Bay is proceeding, and Hydro is pursuing other sources of Western coal, both in Alberta and B.C.

Using a Coronaphone, a Hydro engineer checks for noises of small electrical discharges at a transmission test station.



The year 1975 was one of intensive activity in the Hydro system expansion sector as construction continued at the Bruce Nuclear Power Development, Lennox, Pickering, Thunder Bay, Wesleyville, Arnprior and Nanticoke.

The presently authorized capital construction program will add about 14,000,000 kilowatts to Ontario Hydro's generating capacity by 1985.

However, in July, 1975, the Provincial Treasurer requested that Hydro reduce its capital program, and in January 1976, further restrictions were placed on Ontario's public borrowing. These two actions resulted in a revised capital program affecting 11 major projects and reducing capital expenditures by \$6.4 billion through to 1985.

Restraints affect 11 projects

The fourth heavy water plant at the Bruce Nuclear complex was cancelled. This \$562 million plant, with a planned capacity of 600 megagrams per year, was scheduled for completion in 1980.

Completion date of the third heavy water plant at Bruce was postponed for two years.

The second Bruce Generating Station, a four-unit, nuclear-powered plant of 3,200,000 kilowatts capacity, had its in-service dates deferred for one year, with the first unit now scheduled to enter service in 1983. Formal approval of the construction schedule of this \$2.7 billion plant had been received from the Ministry of Energy on October 8, 1975.

The second steam transformer plant at the Bruce complex, a \$206 million project had its completion date postponed one year to 1982.

Pickering "B" Generating Station, a twin to the existing 2,160,000 kilowatt Pickering "A" nuclear station, being built at an estimated cost of \$1.8 billion, had its completion date deferred one year with the first of four units now scheduled to be in-service by 1981.

Thunder Bay Generating Station, a two-unit, 300,000 kilowatt coal-fired extension to the existing station costing \$345 million, was also postponed one year with completion dates now set at 1980 and 1981.

Atikokan Generating Station, a proposed coal-fired station for which the site purchase had been approved by government in May, 1975, was delayed one year, with in-service dates for the four units now 1983 and 1984.

Wesleyville Generating Station, a four-unit oil-fired plant of 2,295,000 kilowatt capacity with an

estimated cost of \$956 million, has been delayed two years. The units will now come in-service in 1981, 1982 and 1983.

Darlington Generating Station, a \$3.2 billion, four-unit, nuclear plant near Bowmanville, was delayed two years. It will have a capacity of 3,400,000 kilowatts. Formal approval was received in 1975 to proceed with the public participation process for this station. It is now scheduled to begin producing power in 1986.

W-3 Generating Station, a third new power project planned for Northwestern Ontario, was delayed one year with the in-service date for the first unit now 1986.

E-15 Generating Station, was delayed for two years. It is now scheduled for service in 1987. Potential sites for this project are being considered along the North Channel of Lake Huron.



A total of 605 megagrams of heavy water were produced in 1975 at the Bruce heavy water plant, located on the shores of Lake Huron about 120 miles northwest of Toronto.

"During the past year..."

The 4,000,000 kilowatt coal-fired station at Nanticoke, now in partial operation, is scheduled for completion in 1977. With five units now in production, commissioning of Unit 6 is well under way and it should be ready for service by late 1976.

Nanticoke's Unit 2, heavily damaged by fire in 1974, was returned to service in late 1975 after being down for 17 months. The fire was attributed to retaining ring failure and redesigned rings are being installed in all eight units.

At the Pickering nuclear station, where pressure tube leaks were experienced in August 1974, 17 of the 390 pressure tubes in Unit 3 were replaced and the reactor returned to full power by March 1975. Similar problems were subsequently discovered in Unit 4 and by year end replacement of the 57 tubes affected was well under way.

The experience and techniques gained at Pickering

by engineers from Hydro, Atomic Energy of Canada Limited and various suppliers were quickly applied to the 3,200,000 kilowatt Bruce "A" nuclear plant, now under construction. The Bruce pressure tubes for units one and two were stress-relieved and design modifications applied. These actions have caused a six-month delay in the station's start-up date, and it is now expected to be fully operational by 1979.

At the Arnprior generating station, construction work on two hydro-electric units, with a total capacity of 78,000 kilowatts, is scheduled for completion in 1976.

The first unit at Lennox Generating Station, Ontario's first oil-fired station, entered service in January, 1976 and all four units at the 2,295,000-kilowatt plant are scheduled for service by 1977. Regular shipments of residual oil from Quebec City are now arriving at Lennox by unit train.



"Conservation...the most important issue..."

As the social and economic priorities of Ontario have changed, conservation, along with fiscal restraint, has become one of the key considerations in Hydro's planning.

The need for conservation becomes particularly apparent and vital with the realization that Hydro's revised capital program will supply an annual peak growth rate of six per cent. Hydro's forecasts—which were borne out by 1975 demands—indicate a peak growth rate of seven per cent.

Consequently, Hydro is accelerating its program of management symposiums with industry and business to discuss energy waste, efficient lighting, heat reclamation and energy auditing. Hydro specialists are also working closely with the Provincial government's Energy Management Program, whose efforts are mainly directed at efficient heating, ventilation, air conditioning and lighting systems in provincially-owned and leased buildings and educational facilities. Advertising campaigns in both the print and electronic media are also going forward—all aimed at increasing public awareness of the need for conservation and the means of achieving it.

Realizing that rates and their application can be a major factor in conservation, Ontario Hydro has formed a task force that is examining four vital areas: pricing, costing, impact and elasticity, the last two of which will help determine the effect of future rate structures on the electrical energy consumer.

Hydro is co-operating with the Ministry of Energy in an on-going feasibility study to determine if the heating requirements of a medium-sized community could be served economically by extracting heat from existing nuclear stations. While studies to date indicate that such applications would conserve considerable quantities of residential gas and oil supplies, initial capital costs for the distribution and heat storage systems would be extremely high. Also, residual heat from modern electricity generation is extremely low grade and diversions to meet community heating needs would entail the burning of extra fuel during off-peak generation periods in order to build up heat reservoirs.

The public has a strong voice

During 1975 a total of 459 miles of transmission lines were added to the Hydro system, while the retail distribution system grew by 827 miles. The bulk of the new construction involved transmission lines associated with new power generation at Nanticoke and Bruce in Western Ontario and the new generating stations at Lennox and Arnprior in the east.

However, opposition to the construction of 500 kilovolt (kV) lines continued as a major concern during 1975, although government approval was granted early this year to a route recommended by the Solandt Commission for the Lennox-Oshawa 500 kV link.

Public opposition to the 500 kV line required to

transmit power south from the new Bruce nuclear station to Milton T.S., northwest of Toronto, resulted in a 30-mile section being referred to the Environmental Review Board. Hydro plans a new transformer station at Milton, where 500 kV lines from Pickering, Bruce and Nanticoke will meet.

Ontario Hydro, conscious of the impact its transmission lines and stations have on the lives and properties of Ontario residents, continued its extensive public participation and review processes in 1975. A total of 99,602 man-hours were expended by Hydro staff on public hearings at a cost of \$2,070,202. Comparative figures for 1974 are 136,820 man-hours and \$2,660,693. Although the cost of public participation dropped last year because of a shift from heavy involvement with the Solandt Commission to a lighter commitment related to the Bradley-Georgetown transmission lines, the 1975 figures include 15,060 hours and \$290,928 for long-range planning activity and 4,929 hours and \$134,690 for Select Committee hearings—two functions that did not exist in 1974.

Ecology and its importance

To lessen the effect of Hydro installations and transmission lines upon Ontario's rural and urban environment, the Corporation in 1975 continued its policy of introducing on a selective basis more aesthetically pleasing towers and sub-stations, and, where economically feasible, underground transmission lines.

New sub-stations have been reduced in height from a maximum of 23 feet to a maximum of 15 feet and are utilizing screening techniques and landscaping. At Pickering, a storage compound used during construction of the first units has been transformed into a 28-acre hilly parkland, and at the second Pickering nuclear generating station now under construction, excavated material is being piled into a hill designed for skiing.

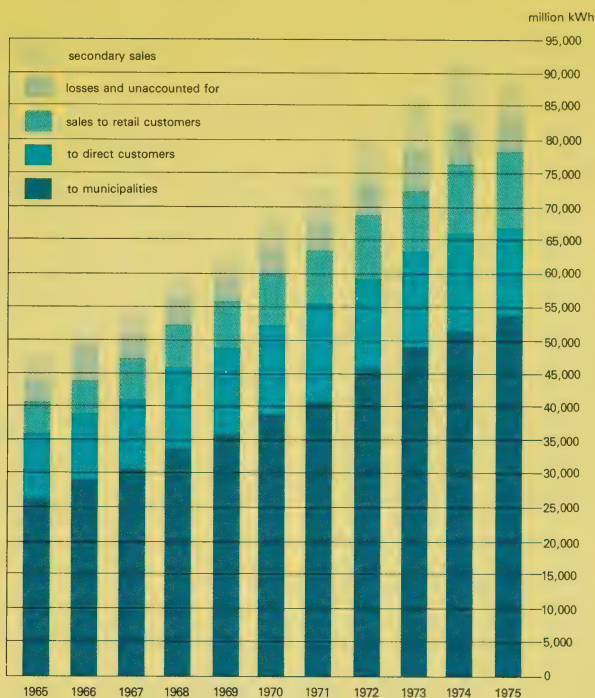
Public usage for recreational purposes of certain Hydro rights of way is also being encouraged, especially in the urban areas. In Metropolitan Toronto there were about 1,200 garden plots in use on Hydro rights of way in 1975.

While the major thrust of Hydro research and testing facilities is directed towards highly technical subjects, the effect of Hydro's operations on the environment is also under intensive study.

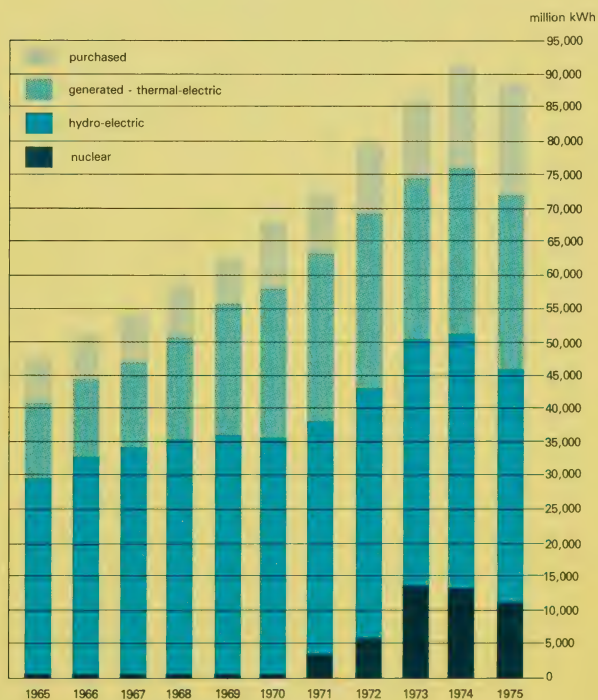
Of principal concern is the ecological effect of discharging warm water from Hydro thermal stations into Ontario's lakes and rivers. While government agencies have set limits on the temperature of the discharge, Hydro is continuing extensive surveys of water conditions, with special attention being paid to marine and plant life. This on-going program assures that corrective action is taken if ecological damage is discovered.

Meanwhile, Hydro is funding university studies to determine the best ways to turn these heat discharges

Disposal of energy
1965-75



Energy made available
1965-75



"Ontario Hydro will continue its efforts..."

to Ontario's advantage, possibly through the creation of lagoons where certain fish species might benefit, or even where the swimming season might be extended.

In the technical field, Hydro's research and test facilities, first established in 1913, assisted in identifying problems of overheating of aluminum wiring connections in some homes. Although this is an issue that developed primarily in the United States, Hydro—in a program carried out jointly with the Canadian Standards Association and cable and wire manufacturers—traced the problem primarily to faulty installation. Modified receptacles which are more compatible with aluminum wiring have been adopted for new construction and advice in replacement practices is being made available to home owners.

Studies, experiments and tests also continued at facilities near Kleinburg into the heat problems encountered in the underground transmission of high-voltage electricity. Tests have shown that air, used as an insulation medium, can be successfully

applied on underground 230 kV lines. Similar tests are continuing in this important field at voltages up to 500 kV.

Hydro research and engineering is also involved in a myriad of other highly technical subjects, all related to more efficient use of electricity and the protection of the environment. These include everything from the development of light-weight concrete made from fly-ash from coal-fired stations to new insulators that will allow higher voltage transmission lines on smaller, less obtrusive towers.

Engineering also got under way in 1975 for the Watts from Waste project using processed garbage to help fuel Lakeview generating station. The joint experiment by Ontario Hydro, Metropolitan Toronto and the Ministry of the Environment is a pilot project expected to be operational by 1979. It calls for Hydro to take 500 tons of Metro Toronto garbage a day, cutting coal needed to fuel the adapted boiler by 10 per cent, and involves modification of one of the 300,000 kilowatt units and on-site fuel storage.

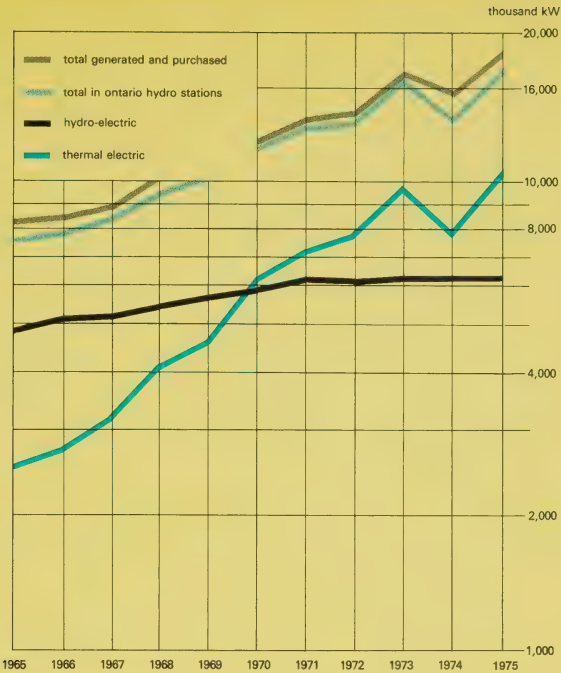
1975 purchases were \$1.4 billion

Hydro purchases in 1975 amounted to \$1.4 billion, which, although less than 1974's record high of \$1.5 billion, were still substantially more than in any other

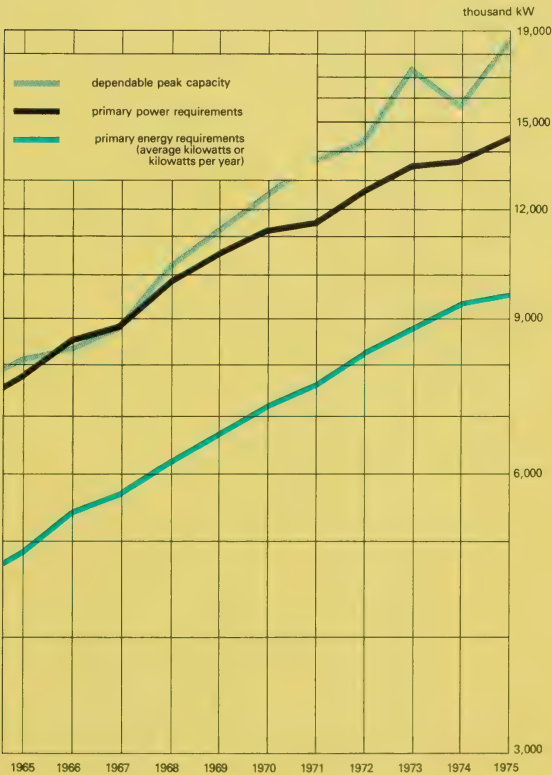
Hydro's aquatic biologists, who keep a close check on the ecological effects of discharging warm water from thermal stations, are safeguarding the marine and plant life in Ontario's lakes and rivers.



Dependable peak capacity of resources 1965-75



Growth in demands and resources 1965-75



year. The decrease from 1974 came about largely through the deferments and uncertainties associated with the capital construction program, especially at Bruce GS 'B', Wesleyville GS and the fourth heavy water plant at Bruce.

Coal consumption, at 7.5 million tons, remained about the same as in 1973 and 1974. Due to market forces arising in 1974 and the wage settlement with United Mineworkers in the U.S., the delivered price rose to an average of \$30 per ton in 1975 compared with \$20 in 1974 and \$13 in 1973. New sources of coal are being developed in Pennsylvania and Western Canada to meet increased coal requirements into the 1980's.

The tight supply market for material and equipment eased in 1975, because of such factors as high inventory levels, overproduction in some areas in 1974, a general business slowdown in 1975, and the deferment of major construction projects in Canada. Lead times for most major items remain unchanged.

Collective agreements were renewed with the 13,000-member Ontario Hydro Employees' Union and the Canadian Union of Operating Engineers, representing 500 employees. Bargaining with the OHEU was completed in three months, demonstrating the success of the two parties in improving relations since the 1972 strike.

Under collective agreements negotiated and administered directly through the Electric Power Systems Construction Association, stable labor relations prevailed and the work of 5,000 tradesmen proceeded without major interruption. Where disruption did occur, satisfactory settlement followed grievance procedures and/or arbitration.

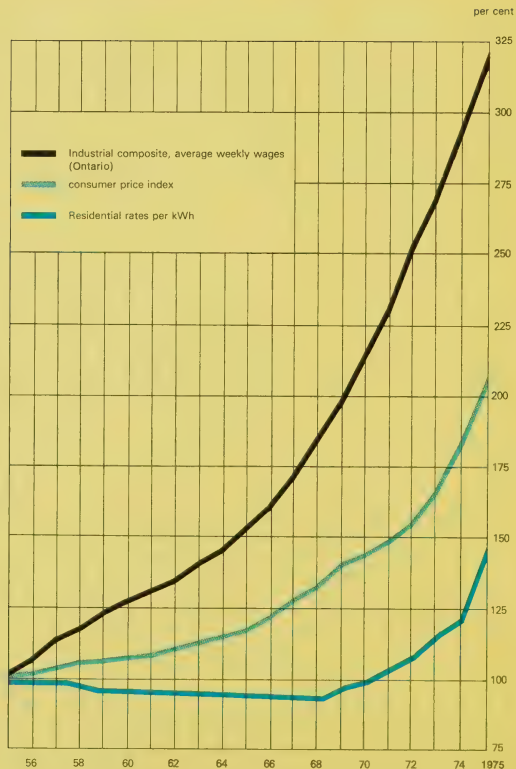
Final offer selection introduced

Bargaining with the Society of Ontario Hydro Professional Engineers and Associates used final offer selection for the first time. This is the process whereby each side presents its position and an arbitrator selects one or the other.

Discussion was suspended following an interim agreement in January, and final agreement was concluded in September. At year-end, preparations were under way to determine by vote the Society's acceptability as a representative of all staff on the management and professional salary schedule.

In November, a long-term disability plan was introduced which provides disabled regular employees with 60 per cent of their basic pay after normal sick leave has been exhausted. Also introduced during the year was a dental plan covering all regular employees and totally funded by the Corporation.

Price of residential electric service in relation to average income and consumer prices 1955-75 (1955=100)



FINANCIAL REPORT

Financial Review

In 1975 Ontario Hydro incurred a loss of \$866 thousand before an extraordinary charge of \$60 million arising from the cancellation of the Bruce Heavy Water Plant 'C', as compared with a net income of \$126 million in 1974. This reduction in income resulted from increases in total costs, including interest, of \$200 million offset in part by revenue increases of \$73 million. Increases in fuel costs accounted for half of the total cost increase. The extraordinary charge, which increased the net loss for 1975 to \$61 million, represents the costs already incurred on the Bruce Heavy Water Plant 'C' for preliminary construction and materials, and provides for estimated costs of cancellation of contracts awarded for materials and equipment net of anticipated salvage credits.

Total revenue from the sale of electrical power and energy increased by 7% over 1974 to \$1,071 million for the year. Revenue from sales of primary power and energy in 1975 were \$1,028 million. This was \$132 million or 15% over the previous year. This increase arose from increases in rates and in the volume of sales. Revenues from sales, by class of customer, were:

Class of Customer	Revenues in \$ million 1975	Revenues in \$ million 1974	Per Cent Increase
Municipal utilities	654	551	19
Retail customers	248	219	13
Direct customers	126	126	—
Total	1,028	896	15

Sales of secondary energy in 1975 amounted to \$43 million, \$59 million lower than in 1974. This decline was almost entirely the result of decreased demand for secondary energy by United States utilities.

Total costs, excluding interest and before the extraordinary charge, rose from \$648 million in 1974 to \$817 million in 1975, an increase of 26%. Operation, maintenance, and administration costs were higher by \$40 million as a result of increases in wage and salary rates, staff levels, and prices paid for materials and services. Fuel costs increased by \$99 million in 1975, mainly due to higher prices paid for coal. The cost of power purchased increased from \$61 million to \$72 million reflecting higher rates together with an increase in the amount purchased. Depreciation costs rose \$13 million in 1975 to \$156 million.

Interest expense increased in 1975 by \$31 million to \$254 million. This represents an increase of 14% and is primarily the result of new borrowings during the year.

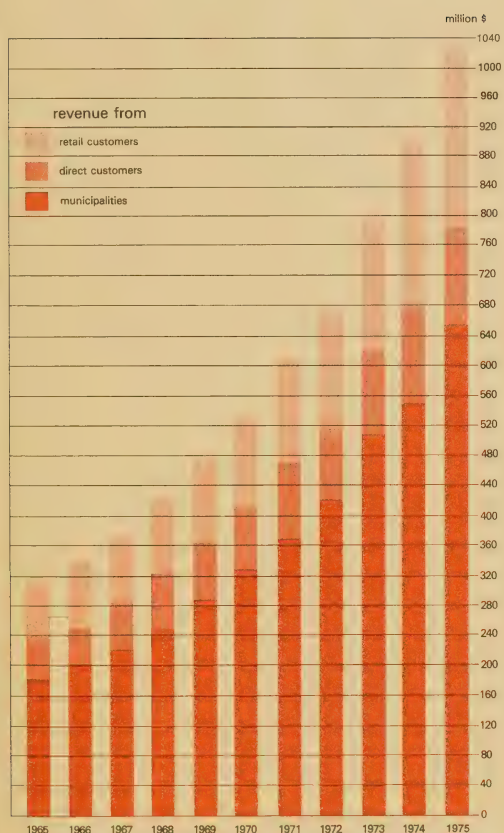
The amount appropriated for debt retirement as required by The Power Corporation Act increased by \$5 million in 1975 to \$78 million. A withdrawal of \$139 million from the stabilization of rates and contingencies reserve was required in 1975 to cover the above appropriation (normally covered by revenues for the year) and a net loss of \$61 million for the year. A provision to the reserve of \$53 million was made in 1974.

The cost of fixed assets in service and under construction increased in 1975 by \$1,416 million to a total of \$8,863 million. Major expenditures included \$795 million for generation facilities, \$198 million for transformation and transmission facilities, and \$251 million for heavy water plants and facilities. The major expenditures for generating stations were \$295 million at Bruce G.S., \$108 million at Pickering G.S., and \$123 million at Lennox G.S. At December 31, 1975 the cost of fixed assets in service and the accumulated depreciation were:

Asset Classification	In-Service Cost \$ million	Accumulated Depreciation \$ million
Generation facilities	3,476	610
Transformation and transmission facilities	1,568	321
Retail distribution facilities	615	186
Heavy water production facilities	257	32
Administration and service facilities	283	87
Total	6,199	1,236

Proceeds from issues of long-term bonds and notes during 1975 totalled \$1,624 million, \$1,601 million from new issues during the year and a balance of \$23 million from a 1974 issue delivered in 1975. Canadian currency issues amounted to \$649 million while foreign issues amounted to \$850 million in United States currency (Can. \$863 million) and 230 million Swiss Francs (Can. \$89 million). The average coupon interest rate of 1975 issues was 9.1% as compared to an average in 1974 of 9.5%. In addition to new bond issues, Ontario Hydro assumed a lease obligation of \$45 million, payable to Canada Crescent Corporation, for the head office building at 700 University Avenue, Toronto. Retirement of long-term debt during the year amounted to \$206 million. Short-term notes outstanding at year-end amounted to \$180 million, a decrease of \$70 million from 1974.

Other significant changes in the financial position were increases in inventories of fuel, materials and supplies by \$150 million to \$367 million, increases in accounts receivable



Primary revenues 1965-75 inclusive

and other assets by \$49 million to \$206 million, and increases in accounts and interest payable (including the estimated liability on cancellation of the heavy water plant) by \$181 million to \$511 million. Total equity decreased by \$61 million to \$1,411 million.

Funds provided from operations during 1975 decreased by \$117 million to \$154 million. Financing provided a net of \$1,368 million in 1975, an increase of \$709 million over 1974. The major application of these funds was for expenditures of \$1,429 million on fixed assets.

Summary of Significant Accounting Policies

The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in Canada. The significant accounting policies are described below.

Fixed assets

Fixed assets include power supply facilities (generation, transformation, transmission and distribution); administration and service facilities (land, buildings, office and service equipment); and heavy water production facilities.

The cost of additions and replacement of component units is capitalized. This cost includes direct material and labour, and overhead costs such as engineering, administration and procurement that are considered applicable to the capital construction program. Interest is capitalized on construction costs based on the preceding three-year average of the cost of long-term funds borrowed. This rate was 8.0% in 1975 and 7.5% in 1974.

In the case of nuclear generation facilities, cost includes the cost of heavy water purchased and produced. The cost of producing heavy water includes the direct costs of production, applicable overheads, interest, and depreciation of the heavy water production facilities.

For normal retirements, the cost of assets retired less salvage proceeds is charged to accumulated depreciation with no gain or loss being reflected in operations. For unusual or premature retirements, the gains or losses on assets retired are reflected in operations.

Depreciation

Since January 1, 1971, all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates for the various classes of assets are based on the estimated service lives, which are subject to periodic review. The service lives of major asset classes are:

Generation — Hydro-electric	50 to 100 years
Generation — Thermal-electric	30 years
Transmission and distribution	25 to 50 years
Heavy water production facilities	20 years

Nuclear agreement — Pickering units 1 & 2

Ontario Hydro, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating

Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2.

Ontario Hydro is required to make monthly payments until the year 2001 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for or withdrawal from the stabilization of rates and contingencies reserve is the amount required to stabilize the effect of abnormal cost fluctuations.

Foreign currency translation

Long-term debt payable in foreign currencies is translated to Canadian currency at rates of exchange at the time of issue. Current monetary assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange. Exchange gains or losses are credited or charged to interest expense in the statement of operations.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, benefit-based plan covering all regular employees of Ontario Hydro. The most recent actuarial valuation of the plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million representing an experience deficiency is being amortized over the years 1974 through 1978 and the balance of \$19 million representing the unfunded liability with respect to improved benefits is being amortized over the years 1974 through 1989.

The pension costs for each year include current service costs and the pro-rata share of the amount required to amortize the unfunded obligation.

Statement of Operations for the year ended December 31, 1975

	1975	1974
	\$'000	\$'000
Revenues		
Primary power and energy	1,027,606	896,270
Secondary power and energy	42,989	101,506
	<u>1,070,595</u>	<u>997,776</u>
Costs		
Operation, maintenance, and administration	315,388	275,257
Fuel used for electric generation	253,276	154,037
Power purchased	72,274	60,699
Nuclear agreement — payback	20,896	15,708
Depreciation (note 8)	155,617	142,456
	<u>817,451</u>	<u>648,157</u>
Income before interest and extraordinary item	253,144	349,619
Interest (note 2)	<u>254,010</u>	<u>223,410</u>
(Loss) income before extraordinary item	(866)	126,209
Extraordinary item (note 1)	<u>60,000</u>	<u>—</u>
Net (loss) income	<u>(60,866)</u>	<u>126,209</u>
Appropriations for (withdrawal from):		
Debt retirement as required by The Power Corporation Act ..	78,360	73,184
Stabilization of rates and contingencies	(139,226)	53,025
	<u>(60,866)</u>	<u>126,209</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Statement of Financial Position as at December 31, 1975

Assets	1975 \$'000	1974 \$'000
Fixed assets		
Fixed assets in service, at cost	6,198,985	5,780,942
Less accumulated depreciation	1,235,810	1,093,272
	<u>4,963,175</u>	<u>4,687,670</u>
Fixed assets under construction, at cost	2,664,119	1,665,829
	<u>7,627,294</u>	<u>6,353,499</u>
Current assets		
Cash and short-term investments (note 3)	144,402	77,046
Accounts receivable	157,311	129,962
Fuel for electric generation, at cost	288,646	158,813
Materials and supplies, at cost	77,892	57,285
	<u>668,251</u>	<u>423,106</u>
Other assets		
Investments (note 4)	186,899	228,710
Debt discount and expense, less amounts written off	62,408	47,680
Investment in coal supply (note 5)	24,997	6,711
Long-term accounts receivable and other assets	23,452	20,583
	<u>297,756</u>	<u>303,684</u>
	<u>8,593,301</u>	<u>7,080,289</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Liabilities

1975

1974

\$'000

\$'000

Long-term debt

Bonds and notes payable (note 6)	6,207,733	4,782,514
Other long-term debt (note 7)	283,908	245,900
	<u>6,491,641</u>	<u>5,028,414</u>
Less payable within one year	179,659	118,560
	<u>6,311,982</u>	<u>4,909,854</u>

Current liabilities

Accounts payable and accrued charges	355,212	225,084
Notes payable	180,140	249,985
Accrued interest	127,500	104,876
Long-term debt payable within one year	179,659	118,560
Estimated liability on cancellation of heavy water plant (note 1)	27,834	—
	<u>870,345</u>	<u>698,505</u>

Equity

Equities accumulated through debt retirement appropriations	1,094,081	1,015,725
Reserve for stabilization of rates and contingencies	190,198	329,510
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	<u>1,410,974</u>	<u>1,471,930</u>
	<u>8,593,301</u>	<u>7,080,289</u>

On behalf of the Board



Chairman



President

**Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1975**

	Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
		Municipalities	Direct Customers	Retail Customers	1975	1974
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	359,326	1,144	(10,923)	(20,037)	329,510	276,565
Appropriation (withdrawal)	(136,676)	86	4,072	(6,708)	(139,226)	53,025
Payment to Ontario Municipal Electric Association	—	(86)	—	—	(86)	(80)
Balances at end of year	222,650	1,144	(6,851)	(26,745)	190,198	329,510

**Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1975**

	Municipalities	Power District (Retail and Direct Customers)	Totals	
			1975	1974
	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	705,998	309,727	1,015,725	942,586
Add:				
Debt retirement appropriation	52,474	25,886	78,360	73,184
Annexation transfers and refunds	8	(12)	(4)	(45)
Balances at end of year	758,480	335,601	1,094,081	1,015,725

See accompanying summary of significant accounting policies and notes to financial statements.

Statement of Changes in Financial Position for the year ended December 31, 1975

	1975 \$'000	1974 \$'000
Source of funds		
Operations		
(Loss) income before extraordinary item	(866)	126,209
Add charges not requiring funds in the current year		
Depreciation	155,617	142,456
Other items — net	(1,153)	2,361
	<u>153,598</u>	<u>271,026</u>
Financing		
Long-term debt		
Bonds and notes issued	1,624,113	670,156
Lease obligations assumed on head office building (note 7)	45,000	—
Less retirements	(205,886)	(163,801)
	<u>1,463,227</u>	<u>506,355</u>
Short-term notes — (decrease) increase	(69,845)	71,185
Cash and investments — (increase) decrease ..	<u>(25,545)</u>	<u>81,389</u>
	<u>1,367,837</u>	<u>658,929</u>
Increase in accounts and interest payable including estimated liability on cancellation of heavy water plant	<u>180,586</u>	<u>33,499</u>
	<u>1,702,021</u>	<u>963,454</u>
Application of funds		
Net additions to fixed assets	1,429,412	873,854
Extraordinary item-loss on cancellation of heavy water plant (note 1)	60,000	—
Increases in fuel, materials and supplies	150,440	63,550
Increase in accounts receivable and other assets	48,504	20,552
Other items — net	<u>13,665</u>	<u>5,498</u>
	<u>1,702,021</u>	<u>963,454</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Notes to financial statements

1. Extraordinary item

During 1975, in response to the Ontario Government's publicly expressed concern about capital availability, Ontario Hydro reviewed its capital construction program. On February 11, 1976 certain specific revisions to the long-term capital construction program were announced, involving the cancellation of Bruce Heavy Water Plant "C", the deferment of proposed new generating stations, and the postponement of completion of some generating stations currently under construction. Over the next ten years these revisions are expected to reduce planned expenditures by \$5.2 billion. The cancellation of the heavy water plant has resulted in an extraordinary charge of \$60 million against income to write off the cost of preliminary construction and materials, incurred during 1975, and to provide for the estimated costs of cancellation of contracts awarded for materials and equipment. (Construction of this heavy water plant had been estimated to cost \$562 million.) The provision for estimated costs of cancellation reflects the best current judgement of management, but may be subject to adjustment when the final amounts are known.

2. Interest

Interest costs consisted of:

	1975	1974
	\$'000	\$'000
Interest on bonds, notes, and other debt	459,866	362,145
Less:		
Interest capitalized	149,197	84,806
Interest on heavy water production facilities— charged to cost of heavy water	18,538	18,177
Interest earned on investments	34,049	32,111
Net gain on redemption of bonds and sale of investments	7,622	3,012
Foreign exchange (loss) gain on redemption and translation of foreign debt	(3,550)	629
	<u>205,856</u>	<u>138,735</u>
	<u>254,010</u>	<u>223,410</u>

3. Cash and short-term investments

	1975	1974
	\$'000	\$'000
Cash and short-term investments, with short-term investments recorded at cost (approximately market value), consisted of:		
Cash	8,814	7,938
Notes of, and interest bearing deposits with, banks and trust companies	108,016	35,011
Government and government-guaranteed bonds	22,597	27,140
Corporate bonds and notes	4,975	6,957
	<u>144,402</u>	<u>77,046</u>

4. Investments

These investments, with maturities beyond one year, are recorded at amortized cost and consisted of:

	1975	1974
	\$'000	\$'000
Government and government-guaranteed bonds	168,102	194,442
Corporate bonds and notes	18,797	34,268
	<u>186,899</u>	<u>228,710</u>

Market value of these investments at December 31, 1975 was \$161 million (1974—\$208 million).

5. Investment in coal supply

Ontario Hydro and United States Steel Corporation have entered into an agreement for the development of a coal mine owned by United States Steel Corporation for the supply of 90 million tons of coal to Ontario Hydro over a thirty-year period commencing in 1976. Ontario Hydro has agreed to advance up to \$48 million for mine development and equipment, to guarantee lease payments for mine equipment and rolling stock leased by United States Steel Corporation, and to make subsequent advances for a portion of the cost of equipment replacements. Advances and associated costs, such as interest, amounted to \$25 million to December 31, 1975. These advances and associated costs are to be amortized on a tonnage basis and included as part of the cost of the coal purchased under this agreement.

6. Bonds and notes payable

Bonds and notes payable, expressed in Canadian dollars are summarized by years of maturity and by the currency in which payable in the following table:

Years of maturity	1975			Weighted Average Coupon Rate	1974	
	Principal outstanding \$'000				Principal outstanding \$'000	Weighted Average Coupon Rate
	Canadian	Foreign	Total			
1975	—	—	—		111,960	
1976	166,327	5,830	172,157		170,910	
1977	125,767	10,543	136,310		135,982	
1978	171,685	55,559	227,244		218,765	
1979	137,602	10,544	148,146		148,270	
1980	77,050	178,818	255,868		—	
1- 5 years	678,431	261,294	939,725	6.1%	785,887	5.7%
6-10 years	801,045	436,639	1,237,684	7.3	728,809	6.0
11-15 years	270,445	115,530	385,975	6.0	358,340	6.0
16-20 years	416,497	—	416,497	8.1	381,295	7.1
21-25 years	1,398,812	589,383	1,988,195	8.4	1,668,312	8.0
26-30 years	—	1,239,657	1,239,657	8.8	859,871	8.6
	<u>3,565,230</u>	<u>2,642,503</u>	<u>6,207,733</u>		<u>4,782,514</u>	
Currency in which payable						
Canadian dollars			3,565,230		3,028,634	
United States dollars			2,392,984		1,590,859	
West German Deutschmarks			134,858		137,109	
Swiss Francs			114,661		25,912	
			<u>6,207,733</u>		<u>4,782,514</u>	

(1) All bonds and notes payable are guaranteed as to principal and interest by the Province of Ontario. Bonds and notes payable in U.S. dollars include \$2,282 million (1974—\$1,556 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario bonds sold in the United States on behalf of Ontario Hydro.

(2) Long-term bonds and notes payable in foreign currencies are translated to Canadian currency at rates of exchange at time of issue. If translated at year-end rates of exchange, the total Canadian dollar liability would be increased (decreased) by a net of:

	1975	1974
	\$'000	\$'000
United States dollars	(5,205)	(46,013)
West German Deutschmarks	34,183	49,821
Swiss Francs	13,478	13,358
	<u>42,456</u>	<u>17,166</u>

7. Other long-term debt

Other long-term debt consisted of:

	1975	1974
	\$'000	\$'000
(a) The balance due to Atomic Energy of Canada Limited for the purchase of Bruce Heavy Water Plant "A". Under the purchase agreement, Ontario Hydro pays equal monthly instalments of blended principal and interest to December 28, 1992, with interest at the rate of 7.795%	239,300	245,900
(b) Lease obligations assumed under the lease with Canada Crescent Corporation for the head office building at 700 University Avenue, Toronto. Effective October 1, 1975, the date of commencement of the lease, an amount of \$45 million (U.S. \$43.9 million) being the present value of the future rentals under the lease (excluding charges for taxes, utilities and maintenance), discounted at an interest rate of 8%, was capitalized as a fixed asset under "administration and service facilities". The lease term is for the 30-year period ending September 30, 2005, at which time ownership of the building may be acquired by Ontario Hydro for \$1	44,608	—
	<u>283,908</u>	<u>245,900</u>

Payments required on the above debt, exclusive of interest, will total \$44 million over the next five years. The amount payable within one year is \$7.5 million (1974—\$6.6 million).

8. Reclassification of 1974 comparative figures

In order to be consistent with the presentation adopted in 1975, an amount of \$13,103,000 previously included with operation, maintenance and administration expense in 1974 has been reclassified as depreciation.

9. Anti-Inflation program

Effective October 14, 1975 the Government of Canada passed the Anti-Inflation Act (Canada). Subsequently, the Province of Ontario entered into an agreement with the Federal Government whereby Ontario Hydro is subject to the guidelines under this Act only in the matter of employee compensation. Ontario Hydro's prices for electricity will continue to be reviewed by the Ontario Energy Board. It is not anticipated that the Anti-Inflation Act will have any material effect on the 1975 financial statements of the Corporation.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1975 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations, and changes in financial position for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1975 and the results of its operations and the changes in its financial position for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 8, 1976

CLARKSON, GORDON & CO.
Chartered Accountants



"Its openness reflects Hydro's efforts to adapt..."

Hydro Place, the new headquarters building for Ontario Hydro, opened its doors in the summer of 1975, fulfilling a long-standing need for centralized staff accommodation and reflecting the Corporation's concern for financial economies, functional efficiency and energy conservation.

With its sweeping glass facade, the \$44,000,000 building at 700 University Avenue is a striking addition to Toronto's skyline and a not unattractive contribution to the aesthetics of the Queen's Park panorama, a good deal of which it literally reflects.

The 20-storey building, with 1.3 million square feet of floor space, was designed, constructed and financed by Canada Square Corporation on a leaseback arrangement which will give Hydro full ownership in 30 years for payment of \$1. So at a time when substantial and increased amounts were needed for the expansion of the utility's plants and facilities, the need for investing any money in the head office building was avoided.

Under the arrangement, Hydro occupies the building at a fixed base rental of \$4.84 per square foot, including all normal service maintenance. When taxes and tenant improvement costs—plus the value of the land, which Hydro purchased long ago—are added at full value, the total rate per square foot amounts to approximately \$8, which compares favourably with rental rates in downtown Toronto.

Another important aspect of the agreement is that Hydro's rental rate remains partially inflation-proof for 30 years because payments remain fixed except for fluctuations in maintenance costs, municipal taxes and exchange rates on foreign borrowings.

The office landscape arrangement on each of the 19 floors permits complete flexibility in organizing work groups to meet changing needs. Instead of fixed partitions, attractive screens and planters are used to provide a degree of privacy, to guide traffic and muffle sound.

Reported Ontario Hydro Chairman Robert Taylor: "... its openness reflects Hydro's approach or

philosophy and its efforts to adapt to this strange and wonderful world we're living in ... and I'll be the first chairman in Hydro's history to be without any door at all."

Designed not only to meet the specific requirements of Ontario Hydro, the new building is a "people place" complete with shops, auditorium, library, restaurants and a multi-level plaza landscaped with trees and shrubs. Two escalators and a glass-domed walkway connect Hydro Place with the Toronto subway system while a tunnel provides access to an existing building that houses computer facilities.

But handsome and functional as Hydro Place is, energy conservation is the feature that is attracting widest attention.

Without a furnace or heating plant of any kind, Hydro Place features an internal source heat pump system that collects heat from lighting, people and equipment in the core area for perimeter heating in winter. It also provides cooling where necessary throughout the year.

Heated and chilled water are stored in a compartmentalized underground storage tank containing 1.6 million gallons of water—the largest known energy conservation tank in existence—for use as required. It is operated by means of sensing devices and a computer control system.

Further economies are achieved by using double-glazed reflective glass windows and insulation either to conserve heat or to reduce energy use for cooling, depending upon the time of year. The lighting load has been reduced by about 33 per cent by integrating fluorescent units with reflective, V-shaped coffered ceiling panels.

Designers estimate that the total energy consumption will be 50 per cent less than for new conventional buildings of similar size. That saving in annual energy consumption is estimated to amount to 20 million kilowatt-hours—enough to supply 2,200 average homes.





Comparative Statistics

	1975	1974	1973	1970	1965
Dependable peak capacity ('000 kW)	18,667	15,759†	17,501	12,670	8,199
Primary peak demand ('000 kW)	14,513	13,538	13,606	11,289	7,818
Primary energy made available ('000,000 kWh)	84,222	82,696	78,163	64,289	43,584
Primary energy sales ('000,000 kWh)					
Municipalities	54,500*	51,852	49,340	38,848	26,842
Retail	11,700*	10,736	9,880	7,560	4,371
Direct	13,100*	14,829	14,075	13,679	9,138
Total	79,300*	77,417	73,295	60,087	40,351
Secondary energy sales ('000,000 kWh)	4,918	8,078	7,745	3,728	3,862
Number of ultimate customers ('000)					
Residential	2,245*	2,190	2,140	2,014	1,813
Farm	123*	124	124	129	134
General	285*	279	273	246	195
Total	2,653*	2,593	2,537	2,389	2,142
Average annual energy used (kWh) per customer					
Residential	9,300*	8,971	8,620	7,750	6,149
Farm	15,900*	15,300	14,332	12,305	8,664
General	200,000*	195,322	190,600	174,339	139,701
Average revenue per kWh (¢)					
Residential	1.95*	1.74	1.63	1.38	1.25
Farm	2.25*	2.06	1.87	1.76	1.74
General	1.30*	1.21	1.13	0.94	0.85
Miles of line					
Transmission	23,741	23,282	22,920	21,208	19,050
Retail distribution	55,567	54,740	54,116	51,777	49,435
Long-term bonds and notes issued (\$'000,000)	1,588	700	535	494	129
Gross expenditures on fixed assets (\$'000,000)	1,442	890	997	511	150
Revenues (\$'000,000)					
Primary power and energy	1,028	896	794	534	311
Secondary power and energy	43	102	62	20	4
Assets (\$'000,000)	8,593	7,080	6,343	4,613	2,987
Staff, average for year	25,361	23,612	22,962	22,584	14,996

*Preliminary

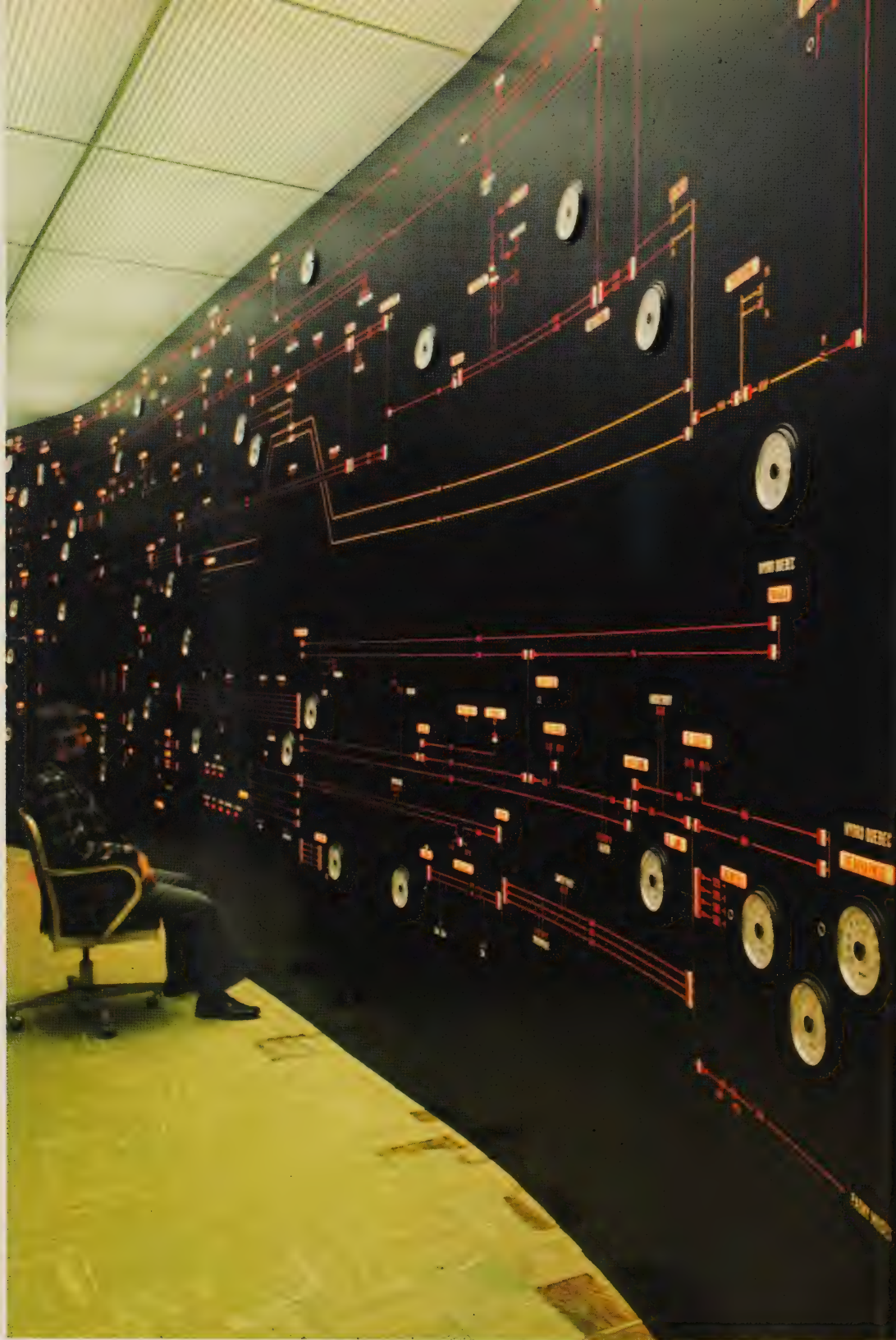
†Major equipment failures at Pickering GS and Nanticoke GS reduced the generating capacity at the end of 1974 by one unit at Pickering and four units at Nanticoke.



Over and under: At the right, a farmer prepares his fields for planting under a 230-kV right of way. Below, workers near Kleinburg construct facilities for the study of ducted air medium underground transmission.

“Conscious of the impact its lines and stations...”





“Ontario Hydro: a special statutory corporation...”

Providing electric power to Ontario's cities and towns, its industries and its farms, is a difficult and demanding responsibility. It is a responsibility that has increased in recent years because of the necessity to match the increased demands for power with those of energy conservation, capital restraints, competing government priorities and environmental concerns. And while Ontario Hydro is a public utility, it nevertheless must function with the financial and managerial skill of the largest private corporation and the social conscience of a conservation-minded public servant.

Ontario Hydro is a special statutory corporation which administers an electric power enterprise and has broad powers to produce, buy and deliver electric power throughout the Province of Ontario. It was created as a financially self-sustaining body corporate under the name of The Hydro-Electric Power Commission of Ontario by an Act of the Provincial Legislature passed in 1906. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c 354 as amended.

The Power Commission Amendment Act, 1973, which came into force on March 4, 1974, changed the name of the Corporation from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro". It also changed the form of the administration of Ontario Hydro from a six-man commission to a Board of Directors composed of a Chairman, a Vice-Chairman, a President, and not more than 10 other directors. The Act also changed the title of the Corporation's enabling legislation from "The Power Commission Act" to "The Power Corporation Act". These changes did not affect the rights or obligations of the Corporation.

In October, 1974, the Board of Directors approved a

The vast control panel of the Data Acquisition and Computer System (DACS) at the Richview Control Centre can provide a status report on the entire Ontario Hydro system every two seconds. DACS vastly improves the security and reliability of the power network as it becomes increasingly complex and inter-related with other utilities.

major reorganization at senior management level, including establishing a new Corporate Office. The Corporate Office, comprising the president and three vice-presidents, will focus on overall corporate objectives and policies, with day-to-day operations being the responsibility of seven general managers who report to the vice-presidents.

Ontario Hydro is primarily concerned with providing electric power in the Province by generation or purchase and delivering it in bulk to the municipalities for resale to 101 direct industrial customers such as pulp and paper, mines and electro-chemical and metallurgical industries. The remaining primary sales are made to retail customers either in rural areas or certain communities not served by municipal utilities. Ontario Hydro also makes secondary sales to other power systems.

Certain regulatory functions

In addition to supplying power, Ontario Hydro, as required by Provincial legislation, exercises certain regulatory functions with respect to the electrical service provided by municipalities. For administrative purposes, Ontario Hydro maintains seven regional offices in various parts of the province and a total of 61 area offices for the administration and operation of the rural system.

The basic principle governing the financial aspect of Ontario Hydro's operations is that service is provided at cost, which is defined in The Power Corporation Act to include charges for power purchased, operation, maintenance, administration, fixed charges, and reserve adjustments. The fixed charges comprise interest, depreciation, and a provision for the retirement of debt over a 40-year period. The municipalities, operating under cost contracts with Ontario Hydro, are billed monthly at rates based on estimates of the cost of providing service throughout the year.

The Province guarantees the payment of principal and interest on all bonds and notes issued to the public by Ontario Hydro. When borrowing on the U.S. public market, the Province issues bonds on behalf of Hydro.

Pension and Insurance Fund Statement of Assets as at December 31, 1975

	<u>1975</u> <u>\$'000</u>	<u>1974</u> <u>\$'000</u>
Fixed income securities		
Government and government-guaranteed bonds	119,873	145,660
Corporate bonds	108,299	74,279
First mortgages	170,666	133,685
Total fixed income securities	<u>398,838</u>	<u>353,624</u>
Equities — corporate shares	189,512	158,529
Cash and short-term investments	170	3,187
Total investments	<u>588,520</u>	<u>515,340</u>
Accrued interest	5,595	4,784
Receivable from Ontario Hydro	5,372	796
	<u><u>599,487</u></u>	<u><u>520,920</u></u>

Notes

1. The most recent actuarial valuation of the plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million representing an experience deficiency is being amortized over the years 1974 through 1978 and the balance of \$19 million representing the unfunded liability with respect to improved benefits is being amortized over the years 1974 through 1989.

2. In the above statement of assets, bonds are included at amortized cost, first mortgages at balance of principal outstanding and shares at cost. Total bonds and shares at December 31, 1975 with a book value of \$418 million had a market value of \$372 million. (1974: book value \$378 million — market value \$304 million)

Auditors' Report

(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1975. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1975.

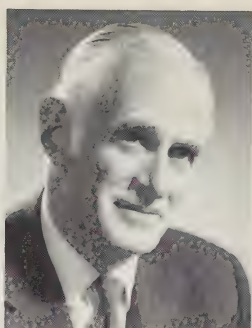
Toronto, Canada
March 8, 1976

CLARKSON, GORDON & CO.
Chartered Accountants

Ontario Hydro Vice-Presidents & General Managers



H. A. SMITH
Vice-President
Engineering & Operations



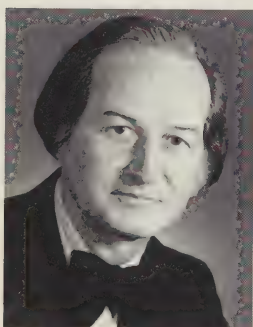
H. J. SISSONS
Vice-President
Distribution



M. NASTICH
Vice-President
Resources



P. G. CAMPBELL
General Manager
Design & Construction



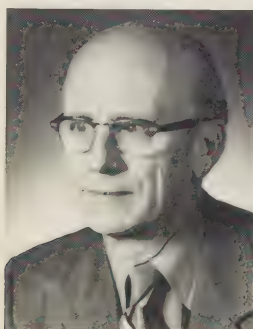
L. G. McCONNELL
General Manager
Operations



G. R. CURRIE
General Manager
Regions & Marketing



W. D. GILLMAN
General Manager
Computers



F. W. GOMER
General Manager
Finance



G. M. McHENRY
General Manager
Personnel



W. C. CUNNINGHAM
General Manager
Services

Ontario Hydro Regional Managers

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Central Region
5760 Yonge St.
Willowdale, M2M 3T7



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Eastern Region
420 Dundas St. E.
Belleville, K8N 5C3



P. J. GARLOUGH
Georgian Bay Region
93 Bell Farm Road
Barrie, L4M 1H1



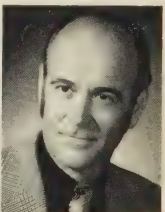
R. S. GRIFFIN
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Ontario
Hydro
Annual
Report



1976

Ontario Hydro

Head Office
700 University Avenue, Toronto, M5G 1X6

Board of Directors

- †William Dodge, O.C., Ottawa
Former Secretary-Treasurer
Canadian Labour Congress
- †*Douglas J. Gordon, Toronto
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- Robert H. Hay, Kingston
Member, Kingston Public Utilities Commission
- †Douglas G. Hugill, Sault Ste. Marie
Tax Consultant
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Canadian Tire Corporation Limited
- †Mrs. A. C. Pigott, Ottawa
President and Chief Executive Officer
Morrison Lamothe Foods
Resigned October 25, 1976 upon election to
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- Robert M. Schmon, Niagara-on-the-Lake
President and Chief Executive Officer
The Ontario Paper Company Limited
- William A. Stewart, Denfield
Former Ontario Minister of Agriculture
and Food
- †*Robert B. Taylor, F.C.A., Toronto
Chairman, Ontario Hydro
- *Robert J. Uffen, F.R.S.C., Kingston
Vice-Chairman, Ontario Hydro
Dean, Faculty of Applied Science
Queen's University

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William E. Raney, Q.C.
Secretary and General Counsel

†Member of the Audit Committee

*Member of the Finance Committee



At Beamsville District Secondary School energy seminar, Chairman R. B. Taylor and students examine reactor model.

Report of the Board of Directors of Ontario Hydro for the year 1976

To The
Honourable James Taylor, Q.C.,
Minister of Energy

The Corporation's financial outlook brightened considerably in the fall of 1976 when the Ontario Energy Board concluded its examination of the 1977 rate proposal and recommended an increase averaging 30.3 per cent in wholesale power rates. The Hydro Board was encouraged by the OEB's findings and its support for such a large but necessary increase.

While the Hydro Board and the OEB both recognized the impact of such an increase on consumers in a time of anti-inflation constraints, they were convinced that only an increase of that magnitude could ease the deterioration of the Corporation's financial position and preserve its ability to attract capital at reasonable rates. The price of electricity must reflect the true costs of producing and distributing it in today's world. This stabilized financial position and expectations of more favourable operating results in 1977 means that the rate change necessary to cover costs forecast for 1978 — which will be submitted to the Minister of Energy by April 30th — is expected to be substantially

lower than this year's increase.

The year 1976, however, was financially disappointing. Although Ontario Hydro was able to comply with the borrowing restraints imposed by the Government of Ontario, revenues in 1976 fell below the forecast level and once again the Corporation failed even to produce enough revenue to meet the statutory requirement for debt retirement. No funds from revenues were available for system expansion.

There were two main reasons for that result. First, the 1976 rate increase finally recommended by the Select Committee of the Legislature in mid-year and confirmed by the Government was lower than that considered necessary, by both the Hydro Board and the Energy Board, to halt further deterioration in Hydro's financial position. Second, net income was substantially below expectations because of adverse conditions affecting the provincial economy. The final figures show the result. Net income for 1976 was \$52.5 million instead of the \$100 million assumed by the Select Committee. Since the statutory debt

retirement obligation totalled \$87.6 million, the remaining \$35.1 million was withdrawn from reserves.

Continuing public concern about the heavy burden of financing the growth of the provincial power system was reflected in the deliberations of the Select Committee of the Legislature enquiring into Hydro's 1976 rate proposals. In an attempt to establish new priorities, the Committee in June released a far ranging report, entitled A New Public Policy Direction for Ontario Hydro.

Its principal recommendation was that planned additions to the power system be scaled down substantially beyond the reductions already directed by the Hydro Board in response to Government constraints on borrowing. The deferments in construction of new power stations and the cancellation of one heavy water plant resulting from those constraints are expected to reduce capital expenditures by \$7 billion and generating capacity by 4 million kilowatts by 1985. The report also recommended the establishment of two new select committees: one to monitor Hydro's response to the first Select Committee's recommendations; the other to consider the Corporation's nuclear commitment. All these recommendations were subsequently accepted by the Government.

The Hydro Board concurred in general with the intent of the Committee's recommendations as reflecting the new social environment in which utilities now operate, the need for the continuation and expansion of aggressive conservation programs, and the requirement to achieve the most efficient use of power stations and fuel resources in the constrained circumstances that lie ahead.

But the Board registered serious misgivings about ordering further cutbacks in the system expansion program before the risks and benefits of such a decision could be carefully weighed. It therefore ordered a complete reassessment of the Corporation's current program along with a review of the economic and social factors involved. It is scheduled for completion and consideration by the Board later this year. Although the Board considered that it would be imprudent to declare

ONTARIO HYDRO BOARD OF DIRECTORS



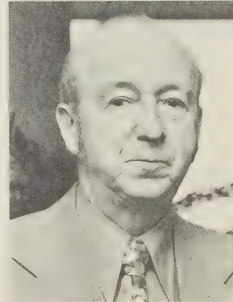
*Robert B. Taylor,
Chairman*



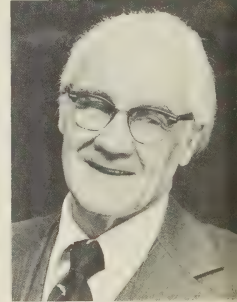
*Jean E. Pigott, M.P.
(Resigned, October 1976)*



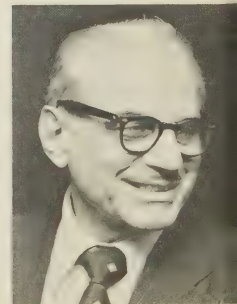
Robert J. Uffen



Douglas G. Hugill



Robert H. Hay



William A. Stewart

committee's recommendations . . .



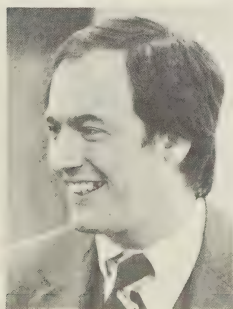
Douglas J. Gordon,
President



William Dodge



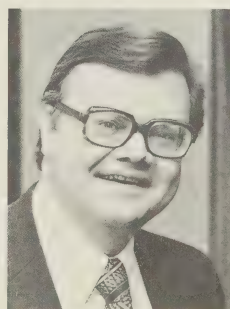
J. Conrad Lavigne



Philip B. Lind



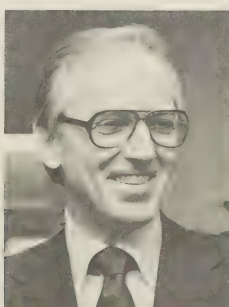
Allen T. Lambert



J. Dean Muncaster



Robert M. Schmon



William E. Raney
Secretary & General Counsel

a complete moratorium on all commitment to and construction of new plants while the review is underway, it did decide to defer major equipment purchases for the Darlington, Atikokan and subsequent stations. Some aspects of these projects as well as public participation for the acquisition of a new station site on the North Channel of Lake Huron proceeded during the year to avoid losing time that would be irrecoverable.

Because of the long lead times of 10 to 15 years needed to take a new power station through planning, approvals and construction, the Board considers this study to be a matter of critical urgency. While there are cost penalties associated with overbuilding, the economic hazards of underbuilding and falling short of customer requirements could be even more hazardous to the economy and well-being of Ontario and Ontarians.

Regardless of future adjustments — up or down — in the expansion of the provincial power system, the central issue facing Hydro today is, and will continue to be, conservation. It is good to be able to report that the intensive program being conducted by Ontario Hydro and the municipal electric system is making considerable progress in achieving greater public awareness of the vital need to conserve.

Development of new equipment and appliance standards to improve efficiency in electrical consumption has been given a high priority, as have programs to assist all types of customers — industrial, commercial, farm and residential — in eliminating waste. Early in the year, a joint study commissioned by the Ministry of Energy and Ontario Hydro into the use of wind power to generate electricity in remote locations was completed. Results of the study are now being discussed by the provincial and federal governments. Work began during the year in Hydro's research laboratories

on a solar assisted water heater and consideration is being given to the installation of an experimental solar heating unit in one of the Corporation's administration buildings.

Despite Hydro and government conservation programs, unusually cold weather and increased industrial activity pushed Ontario's 1976 peak power requirements 9.5% above the 1975 peak. This is substantially higher than the 6% growth rate that must be achieved if the traditional level of reliable service is to be maintained.

These requirements reached record peaks in December and coincided with emergency conditions in the provincial power system, placing the maintenance of a reliable supply of electrical energy in serious jeopardy on several days of the month. The conditions were a combination of severe winter weather, mechanical problems at Nanticoke, low water conditions in northern Ontario and the inadequate transmission facilities to move power out of the Lennox generating station. All this was heightened by the partial withdrawal, under the terms of contract, of firm power by Quebec which was facing similar winter problems.

The locked in power at Lennox during this emergency situation provided a striking example of a problem that increasingly concerns the Hydro Board. Delays in obtaining approvals for urgently needed transmission line rights-of-way and the sheer complexity of the approval processes facing new generating projects not only add substantially to the costs that must be borne by Hydro customers, but also threaten the reliability of the power system itself. The fear now is that new generating units and the lines to move electricity to the customer simply won't be there when needed. Streamlined methods are sorely needed to speed up the approval process while still providing for the legitimate concerns of property

owners, special interest groups and the public generally.

An outstanding success story of 1976 was the performance of the Pickering Nuclear Generating Station and the Bruce Heavy Water Plant. Of four 540,000 kilowatt units at Pickering, three operated at better than 90 per cent capability. In fact, three of the units rated first, second and fourth in terms of reliability among the world's 69 large commercial power reactors. The Bruce Heavy Water Plant A reached a net capacity factor performance of 91 per cent — far above earlier expectations and in happy contrast to the bitter lessons in design, construction and operation experienced by heavy water plants in other parts of Canada.

This report is not the place to debate the pros and cons of nuclear energy — that will be done by the Royal Commission on Electric Power Planning and the Legislature's select committee. However, the Hydro Board believes that for us in Ontario, nuclear energy is the only option that can assure sufficient supplies of electricity to give us a prudent degree of self reliance during the nineteen eighties and nineties. Ontario has abundant supplies of nuclear fuel — uranium — and a proven, economical technology — the CANDU reactor, with its outstanding record for safety and cost efficiency.

But despite the importance of nuclear energy in Hydro's plans, coal remains a significant and important fuel for the generation of electricity in Ontario. Coal consumption is projected to increase from 8.4 million tons in 1976 to between 15 and 18 million tons in the 1980s. During the past year, Ontario Hydro signed long term contracts with certain western Canadian coal producers in order to moderate its growing dependence upon American suppliers. The delivery of 3 to 4 million tons of coal and lignite annually to Ontario from Alberta, British Columbia and

Saskatchewan by the 1980s requires the development of an extensive transportation system in cooperation with the mining companies, railways and shipping lines. A terminal and handling facility is under construction at Thunder Bay and arrangements are being made for the blending of the Western coal with that from the U.S. at Nanticoke.

The year also saw Hydro complete one of the most detailed analyses of its type ever undertaken — the study of the costing and pricing of electricity in Ontario. The purpose of the Hydro Board in authorizing the formal study in 1974 was to produce a document that would serve as a useful focus of discussion. Although the report of the study team endorses the concept of marginal cost pricing, the Hydro Board will take no position on any of the recommendations until public hearings before the Ontario Energy Board are completed. The report's fundamental premise, with which the Hydro Board agrees, is that efficiency in the allocation and use of resources in the production of electric power must be a principal objective in pricing electricity in Ontario.

The Board is saddened to record the tragic crash last September of an aircraft near Abitibi Canyon in northern Ontario that claimed the lives of 10 people involved in the Royal Commission on Electric Power Planning. Among the dead were two dedicated Ontario Hydro employees, John Wesley James, manager of Energy and Environmental Studies and Bryan Roland Isbister, public hearings officer in the Rate and System Expansion Hearings Department, and John Richard Houston, Q.C., Hydro counsel for the Royal Commission. To their families and those of the other victims the Board extends its profound regrets and sympathy.

This report should also note the resignation on October 25 of Mrs. Jean Pigott from the Board of

Directors following her election to the House of Commons. Mrs. Pigott, appointed to the Board in March, 1974, served with distinction as its first woman member. In May, the Board welcomed two new members, William A. Stewart of Denfield, a former Minister of Agriculture and Food, and Robert M. Schmon, of Niagara-on-the-Lake, President of The Ontario Paper Company Limited. In March, 1977, Premier William Davis announced the appointment of Sister Mary Zimmerman, executive director of St. Michael's Hospital, Toronto, to replace Mrs. Pigott, and of Arthur Bowker, of Ottawa, a past president of the Ontario Municipal Electric Association, to replace Douglas Hugill of Sault Ste. Marie. The Board wishes to acknowledge the strong contribution made by Mr. Hugill, also a past president of the OMEA, during his three-year term as a director.

The Board met on two occasions during the year with the executives of the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities, highlighting the continuing cooperation of these associations with Ontario Hydro in serving the province's electrical needs.

We also wish to acknowledge the help and support of the many agencies and branches of government with which the Corporation deals, and in particular the Minister of Energy and his staff.

Finally, to the more than 24,000 employees whose efforts make Ontario Hydro one of the world's finest electric utilities, our thanks for their dedication and hard work on behalf of the people of this province.



On behalf of the Board,
Robert B. Taylor, Chairman

"Abnormal weather . . . unusual demand"

In many ways 1976 was the beginning of a new era for Ontario Hydro. It was a year of testing, a year of developing new techniques, new planning tools, and indeed new philosophies.

Where once the Corporation could estimate consumer demand for electrical energy and then build the plant to satisfy that need, 1976 saw for the first time the planning process for system development dictated primarily by the constraints in capital funds.

Meanwhile, the primary energy consumption rose by 7.9 per cent to 90,853 million kilowatt hours in 1976 and total production increased by 9.4 per cent to 97,478 million kilowatt hours, as compared to 84,222 million and 89,140 million kilowatt hours respectively in 1975. In 1976 a new record peak was also set December 13 as customers' needs in the face of severe winter weather drove demand to 15,895,557 kilowatts, or 9.5 per cent more than the 1975 peak demand.

During the year, Ontario Hydro also generated significantly more of the total power provided to the 2,702,000 customers of Hydro and the 353 associated municipal electrical utilities: 83.7 per cent of the energy made available, compared with 81.6 per cent a year earlier. Purchased energy made up 16.3 per cent.

More specifically, hydraulic generation continued as the single largest source of energy made available in the province, providing 36.1 per cent of total electrical energy. Coal accounted for 23.6 per cent while nuclear followed with 16.5 per cent of the total. Natural gas amounted to 4.6 per cent and oil 2.9 per cent.

Coal, natural gas and oil-fuelled generation continue to account for slightly more than a quarter of total production. Coal consumption rose by 11.3 per cent last year to

8,388,493 tons, while the introduction of the Lennox Generating Station saw residual oil needs move from 821,262 barrels in 1975 to 4,506,750 barrels in 1976. Hydro's use of natural gas in 1976 totalled 49.5 billion cubic feet, down from the 58.3 billion cubic feet used in 1975.

The immediate situation is one of rising fossil fuel costs. Where once Hydro was able to provide relatively inexpensive electricity because of the availability of hydro-electric generating sources, with the percentage of this inexpensive power declining Ontario Hydro is faced with turning increasingly to other alternatives, namely nuclear and fossil fuel fired plants. That increasing reliance on thermal generation means that the cost to the consumer must rise. There is no alternative.

As December approached in 1976, Ontario was experiencing abnormally cold weather, which pushed demand for electricity to unusually high levels. Hydro did not anticipate any major problems meeting this demand but was concerned about a few operating areas. For one thing, water levels and flows in many parts of the province, especially in the northwest and northeast, were so low as to severely restrict the use of hydro-electric stations.

And, due to the lack of a 500 kilovolt transmission line — delayed over a routing dispute — almost 1,000,000 kilowatts of power were locked in at the Lennox station.

All would have been well, in spite of these difficulties, save for an unexpected problem at the Nanticoke Generating Station.

By Wednesday, December 1, with a peak demand at 15,168,550 kilowatts, cracked boiler hanger rods had been discovered on Nanticoke's No. 3 unit. Because of this problem it was also necessary to take the No. 1 unit out of service and reduce

the electrical output of units 4 and 5. As a result the industrial interruptible B customer loads were cut by 45,000 kilowatts. Then towards the end of the day, unit 4 was also taken completely out of service because of boiler hanger rod problems.

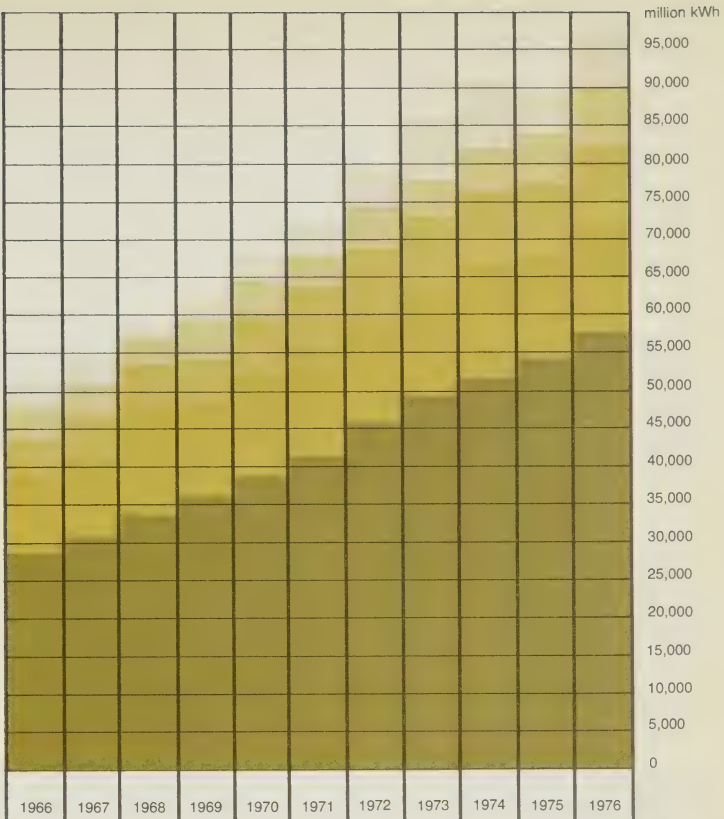
The problems continued on December 2. Hydro faced a record peak demand of 15,756,390 kilowatts and had trouble meeting it. Four 500,000 kilowatt units at Nanticoke were out of commission; some generation was bottled in at Lennox because of the lack of a transmission line; northern stations were facing reduction in generating power because of low water levels and neighbouring utilities suffering cold weather conditions could not sell Ontario much emergency power. The Corporation cut service to its interruptible customers. Later that same evening, fish plugged the cooling water intakes at Lambton Generating Station, shutting it down, and further temporary cuts had to be made.

On December 3, Hydro again faced a tight situation. Peak demand was 14,916,820 kilowatts and Hydro found that its Quebec counterpart was forced to cut exports to this province to 650,000 kilowatts from the normal 1,000,000 kilowatts because of cold weather in Quebec. Ontario Hydro cut interruptible service to both A and B customers and instituted a one-hour voltage reduction. In the afternoon the situation eased and demand was met by purchases from New York and cutting interruptible customers.

The situation looked much improved by December 6. The cold snap broke and commissioning tests of the No. 6 unit at Nanticoke and the No. 2 nuclear unit at Bruce allowed a further 575,000 kilowatts to be fed into the system. Peak demand declined to 14,869,180 kilowatts. At mid-day however, the system lost 1,000,000 kilowatts of

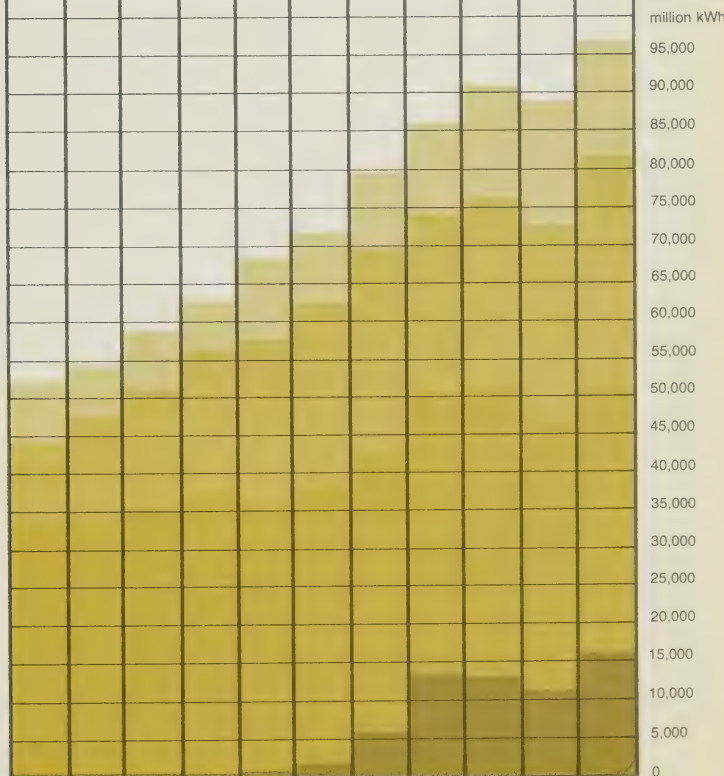
Disposal of energy
1966–1976

- secondary sales
- losses and miscel.
- sales to retail customers
- sales to direct customers
- sales to municipalities



Energy made available
1966–1976

- purchased
- thermal (fossil) electric
- hydro-electric
- thermal electric (nuclear)



power for about an hour. Schools of migrating shad, a small lakefish, again blocked the cooling water intakes at Lambton, forcing two units out of service. At the same time, problems on the Hydro-Quebec system again cut power usually

bought by Ontario by 400,000 kilowatts. Hydro quickly made cuts to interruptible B customers and bought 300,000 kilowatts from the Carolinas. The problem was far from over, however.

Between three and four in the

afternoon the situation again worsened. Fish once again knocked out Lambton — this time all four units. Hydro cut service to interruptible customers, terminated a 100,000 kilowatt power sale to Manitoba and bought 620,000 kilowatts from the United States.

For the remainder of December — aside from relatively minor problems — Hydro was able to carry on supplying the needs of Ontario as well as exporting energy to both Manitoba and the United States.

Benefits of interconnections

The events of this brief, tension-charged period proved beyond doubt the benefits of interconnections with neighbouring utilities in maintaining service to customers during emergencies.

Hydro currently has 34 contracts for interruptible A and B service. These industrial customers enjoy lower rates because their service is liable to interruptions. Yet until December, only the B customers had been affected on three different days during the year, for a total of seven hours. During December, interruptible Bs were cut on five days and As on three. Generally speaking, supplies to interruptible customers continue to have a priority over U.S. utilities. Hydro will not sell power to the United States that is obtained by cutting interruptible B clients unless the U.S. utility is in danger of not meeting the demand of its firm customers; it will not sell in the United States at all if that sale affects Ontario interruptible A customers. Of course, the United States utilities treat us in exactly the same way.

For other Canadian utilities the situation is different. Hydro will sell power to domestic neighbours to help them meet firm demand even if both A and B customers are affected.

The experience of this past December has given the customer a glimpse of what can be expected in



Cucumbers and tomatoes are among the vegetables harvested by the public from garden plots on Hydro rights-of-way in Metropolitan Toronto.

the late 1970s if conservation programs do not work. Adequate reserves are the key to any electrical generating system. The only alternative is chaos. Power cuts could become more frequent towards the 1980s as Hydro struggles to maintain reserves in the face of increased demand.

During the year, despite these problems, progress was made on the following projects:

At Lennox, three of the four 575,000 kilowatt oil fired units were declared in service and the fourth became part of the system early in 1977.

The Thunder Bay extension, providing for the two-unit 300,000 kilowatt coal-fired generating capability, was well underway and the powerhouse substructure was completed. The station's present capacity is 100,000 kilowatts.

The Pickering B nuclear generating station — a duplicate of the existing Pickering A 2,160,000 kilowatt facility — was also well underway and the first unit will be brought in production in 1981.

At Nanticoke, unit 6 was declared in service early in 1977. Units 7 and 8 are expected to be in operation by 1978, providing a total of 1,000,000 kilowatts.

The first unit of the 3.2 million kilowatt Bruce A nuclear station is expected to be in service by mid-1977, followed by the second unit in late 1977. The complete station will be operational by 1979. Site preparation for Bruce B started in September and major construction activity is set for this year. That station should be fully operational by 1986.

Completion of Bruce Heavy Water Plant B is set for 1979 and work will begin again this year on Bruce Heavy Water Plant D with an in-service date of 1981. These projects remain a source of pride to the Corporation. At the Bruce Heavy



A Hydro researcher at Essa TS utilizes an umbrella to show the minimal impact extra high voltage transmission lines have on men and machines working below.

Water Plant, for example, production rose to 799.5 megagrams from 605 megagrams in 1975. The plant operated last year at 91 per cent capacity.

One of the two units at the Arnprior Hydro-Electric Station — which will have a total capacity of 74,100 kilowatts — was completed in September, 1976, while the second unit came into service in March, 1977.

At the same time, Hydro was forced to take certain economy measures including the temporary mothballing of the J. Clark Keith Generating Station in Windsor. The 264,000 kilowatt installation was taken out of service in April, 1976, and will continue out of service until the first half of 1980. During that shutdown period the coal-burning station will be re-designed and modified to meet more stringent air

quality requirements.

As Hydro gains new customers with new requirements each year and as protection of the environment becomes an ever-more important issue, the stress the Corporation places on research becomes key to operations. Not only must the Corporation continually seek new ways to improve the efficiency of the system, squeezing every possible watt of generating power out of its equipment to meet the challenge of the Eighties, but it must also strive to protect the environment in all possible ways.

The effects of generating plants on water bodies is one priority item. Extensive studies are underway to determine the effects of warm water discharge from these plants on fish spawning beds, the food chain to which each species belongs and even the psychological changes fish might undergo when exposed to the effects of generating plants.

The development of a new system of overhead lines also falls into the category of environmental research. A new, compact, aesthetic 115-kv overhead line for urban streets and restricted rights of way is now in the prototype design stage and will be tested this year.

In another key area — conservation — research is also proceeding apace. A feasibility study was conducted this past year in co-operation with the Ministry of Energy on wind generation of electricity. This alternative form of energy could supply part of the power requirements in isolated windy areas where electricity is generated by diesel engines.

Another alternative energy source under study is solar power. Solar-powered water heaters, for example, could eventually replace conventionally equipped appliances and help reduce demand for non-renewable resources. Similar research projects become increasingly important as fossil fuels are rapidly consumed.

Hydro researchers are also

"The Corporation must explain to the public . . ."

working on the development of a heat pump especially suited to the severities of Ontario's climatic conditions. Since heat pumps can extract up to three units of heat from the outside air (that is, solar heat) for each unit of electricity consumed, it presents the possibility of substantial savings in energy use.

As a public corporation, Hydro has a continuing responsibility to inform and consult its customers. It strives constantly to explain its actions to the public. The matter of line and site selection is an example. Although active public debate can delay some projects, the Corporation understands and accepts the fact that the people of Ontario must be involved in many decisions taken by a Corporation that has such a wide-ranging effect on their lives. The most practical method is to seek the co-operation of community leaders and representatives of special interest groups in studies to find suitable generating sites and transmission routes.

Work continued on the 500 kv transmission line from Middleport to connect new transformer stations near Milton, Trafalgar and Claireville. The first 500 kv, double-circuit towers were installed between the Middleport Transformer Station and Highway 401 and the construction of the three 500 kv stations began towards the end of 1976.

The Corporation also recorded progress on other fronts, including: government approval of a 500 kv line from Lennox to Oshawa, as recommended in the Solandt report; the completion of a second 500 kv single-circuit line from Nanticoke to Middleport; completion of a 345 kv interconnection with Detroit Edison near Sarnia; completion of another 180 miles of miscellaneous lines; addition to the system of five new transformer stations and a construction start on a further six new transformer stations.

A note of optimism within the Corporation is labor relations. The

Joint Committee on Relationships, established by Hydro and the Ontario Hydro Employees' Union in 1974, has successfully defused many contentious issues, including the issue of staff cutbacks. In preparation for 1977 bargaining, an information seminar was held in the fall and all parties agreed to employ a bargaining process and schedule similar to those that proved successful in 1975.

Hydro has also agreed to recognize the Society of Ontario Hydro Professional Engineers and Associates as the bargaining group for an enlarged number of employees in matters of compensation and working conditions. Previously the staff represented only professional engineers and scientists. The new agreement provides a framework for collective negotiations outside the Labour Relations Act.

Hydro has also played a major role in helping municipal utilities cope with the tangle of anti-inflation program regulations, providing staff and information to help meet compensation reporting concepts and procedures.

Reflecting the provincially-imposed financial constraints, the Corporation reduced its purchasing to \$1-billion in 1976, compared with \$1.4-billion in 1975 and \$1.5-billion in 1974. Ontario Hydro also renegotiated more than 1,100 contracts totalling almost \$1.5-billion because of deferments in the construction program.

A factor strengthening Hydro's cost saving program was the further easing of the business boom during 1976. The swing toward a buyer's market for many of the commodities and services Hydro must purchase has resulted in a shorter lead time for commonly used material and equipment. Delivery times have also proved to be well within Hydro's normal construction scheduling requirements.

Measures to secure a steady flow of Western Canada coal continued. Deliveries are expected to com-

mence in mid-1978, the result of agreements reached with Luscar Ltd. in Alberta and Byron Creek Collieries of Corbin, B.C. Hydro will also begin receiving Saskatchewan lignite in 1980 to fuel the Thunder Bay Generating Station.

The purchase of substantial amounts of Western Canadian coal reflects a major policy decision by Hydro. In spite of having to accept the higher energy unit costs it seems prudent to develop a long-term Canadian fuel source in order to reduce the Corporation's nearly total dependence on U.S. sources.

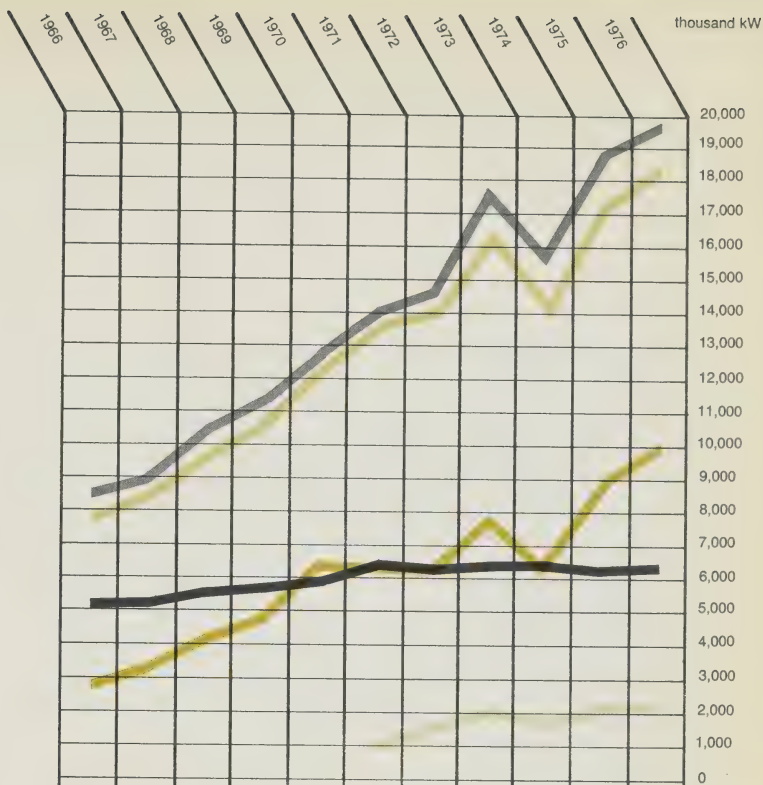
Since boilers in Hydro's existing coal-fired stations are designed to burn U.S. coal and the properties of Western Canadian coal differ substantially in water and sulphur content, the two coals must be blended to achieve satisfactory operating efficiency and to meet air quality requirements. To this end, Hydro has approved the installation of blending facilities at Nanticoke Generating Station and it is expected that initial blending will commence by mid-1978.

Meanwhile, the United States continues to be an important source of coal supplies. In addition to existing contracts the United States Steel Corporation is developing a new mine in Pennsylvania under a contract with Ontario Hydro. The advances being made on this contract by Ontario Hydro toward the development are anticipated to increase by \$20 million from the \$48 million authorized in 1975 to take account of "force majeure" events, changes in government requirements and the impact of inflation.

To further ensure a constant supply of oil for the Lennox station, Hydro has signed a 15-year contract with Petrosar Ltd. for residual oil. It has also concluded leasing arrangements for railway tank cars to transport the fuel to the station. With regard to uranium, negotiations to obtain additional long-term supplies continued during the year. □

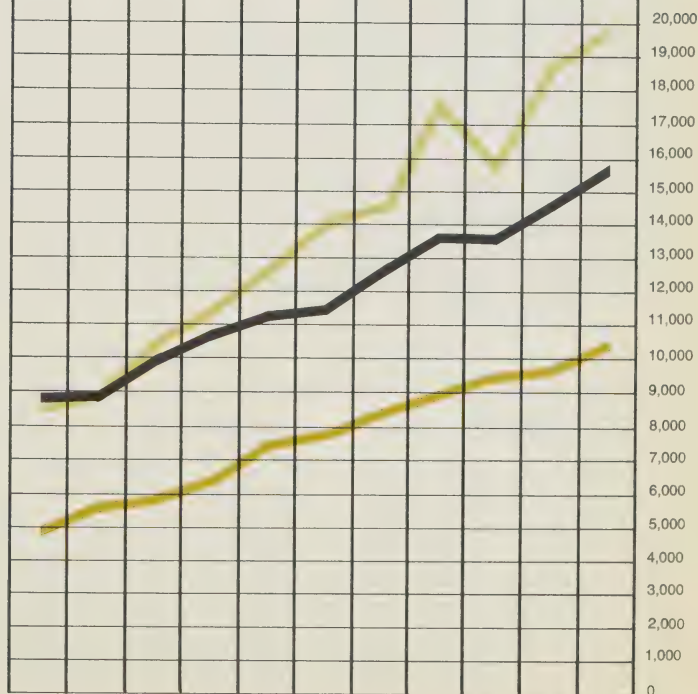
Dependable peak capacity of resources 1966–1976 inclusive

total generated and purchased
total in ontario hydro stations
hydro-electric
fossil
nuclear



Growth in demands and resources 1966–1976 inclusive

dependable peak capacity
primary peak demand
average hourly demand



"And it is with nuclear energy that the future lies . . ."

"The Canadian program to produce electricity from nuclear energy has been a spectacular success story, perhaps the greatest technological achievement in our country's history."

Robert B. Taylor
Chairman, Ontario Hydro

The measure of that statement rests with Ontario Hydro's Pickering station, which demonstrates daily the reliability, efficiency and cost advantages of nuclear energy.

And it is with nuclear energy that the future lies. In Ontario Hydro's judgement it is the only way for the Province to acquire a significant degree of self-reliance in electric energy during the Eighties and Nineties of this century, for uranium is the only substantial unused energy source it has. Nuclear power is the best option not only from the standpoint of availability and cost but also because of its minimal impact on the environment and the all-important conservation factor: nuclear energy allows the saving of fossil fuels for essential tasks that uranium cannot perform.

Decision proved crucial

The decision to explore and exploit Canada's vast nuclear power generation potential, to combine domestic technology and impressive uranium reserves (estimated at 232,000 tons — the energy producing equivalent of 4 billion tons of coal), has proved crucial. Long before the spectres of oil embargoes and ecological confrontation appeared, Ontario Hydro and Atomic Energy of Canada Ltd. had joined forces to develop an efficient, safe nuclear reactor — the Canada Deuterium Uranium (CANDU) unit. Now, that adventure in technology is ranked as one of the world's most reliable reactors.

But sweeping statements such as "world's most reliable" demand closer scrutiny. With the technology and workings of nuclear generators so cloaked behind a dark curtain of

jargon and acronyms, how can the layman hope to seize the merits and potential of nuclear power? What are the tests that can measure the fuel of the future?

Reliability is the first. It brings the certainty that lights and furnaces will go on when the switch is flicked, moderating the rigors of an Ontario winter, and that our countless machines will hum into life. But perhaps more important, nuclear energy is the future hope for providing the large amounts of electrical power required by the factories, stores and offices that provide our livelihood.

While man may develop the technology to draw power from the sun's bright rays or the churning of a windmill, the means to harness either of these for industrial and commercial use continues to elude engineers and scientists.

Nucleonics Week magazine, a reference book for the world nuclear industry, last year ranked the four operating Pickering generators as first, second, fourth and twenty-seventh in terms of reliability among the world's 69 large nuclear generating units. The performance of the fourth unit was marred by a major operating breakdown that kept it out of service for a third of the year.

In simpler terms, three of those units achieved a reliability rating of more than 90 per cent. As a comparison, fossil fuel units in North America have a typical reliability rating of approximately 74 per cent.

The same applies to heavy water production. The first heavy water plant at the Bruce nuclear development operated during 1976 at 91 per cent of potential capacity, or almost double the Canadian average.

Another test must be safety — not just personal safety for plant staff, but also a constant guarding of the environment and the lives and health of all people in the province. Ontario Hydro has never had a fatality or serious injury due to radioactivity: not



even a lost-time injury. In fact, Hydro nuclear generating stations have never had a fatality or permanent disability for any reason and the number of lost-time injuries at nuclear stations, for all reasons, is among the lowest in the Hydro system. And that impressive record covers a 15-year span.

For the public there is the knowledge that Ontario Hydro's stations are safe. Not only has there never been a significant release of radioactivity from any installation, but



The Bruce heavy water and nuclear plants.

emissions — when they do occur as a matter of normal operations — average less than 1 per cent of limits set by the Atomic Energy Control Board.

However, there are public anxieties about nuclear energy, and the management and disposition of irradiated uranium is one of them — a major one. The question has been under study by Ontario Hydro and Atomic Energy of Canada Limited for over twenty years, and there are answers. The matter is now being

considered at official levels of the federal and provincial governments. Eventually the exploration and evaluation of sites for interim storage and for safe, permanent burial of nuclear wastes will be necessary. Meanwhile, the subject will be addressed in detail at the Ontario Royal Commission on Electric Power Planning this spring. In the interim, until the matter is decided, Ontario Hydro has ample and safe facilities to store the irradiated fuels at its nuclear stations.

Then there is the test of cost to

the consumer. During 1976, the total unit energy cost achieved at Pickering reached about one-half the cost of electricity from one of Hydro's coal-burning plants of the same size and vintage.

In addition to the Royal Commission review of the nuclear option for Ontario, a Select Committee of the Legislature will examine Hydro's nuclear commitment in the fall. Both will consider the tests of reliability, safety and economy and then make recommendations. □

"The saving of energy is everybody's business . . ."

Conservation is not a new policy at Ontario Hydro. It is a continuing program, inaugurated before the days of oil embargoes and forecasts of diminishing energy reserves. Now, however, like a gentle breeze growing into hurricane force, conservation has become the most crucial issue facing the province's public power system.

Central to the situation was the \$7-billion cutback in Hydro's expansion plans to 1985, imposed

by a government deeply concerned over the magnitude of provincial spending and borrowing. The cuts removed 4 million kilowatts of generating capacity planned for 1985 — the equivalent of twice Hydro's share of Niagara Falls.

Now, in effect, the Corporation could no longer build to meet demand. It could construct only what the Province thought it could afford. And that constraint will mean an endangered electrical system unless

the people of Ontario can be induced to adopt energy conservation as a habit of life.

The key to the solution is the growth of demand. Historically the demand for power has risen by about 7 per cent a year buoyed by an expanding economy and wave upon wave of immigration. Ontario Hydro has, in past, been able to meet this rate of growth in demand and still provide an adequate reserve margin for emergencies.

The changing economics of electrical generation also dictate conservation. Inflation has taken its inevitable toll, pressing costs higher year by year. So has the necessary transition from inexpensive water power to the more costly thermal generation fuelled by coal and uranium.

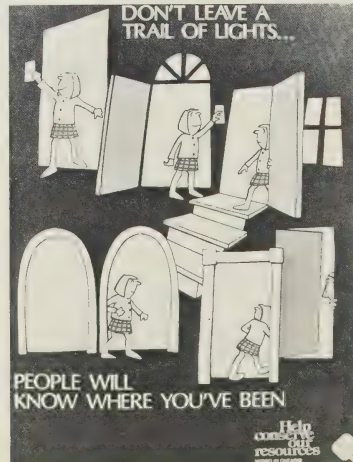
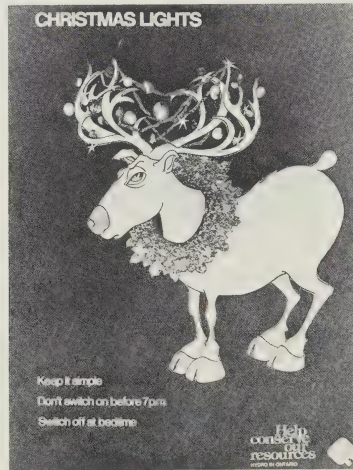
Now, however, the margin between demand and supply is narrowing. This means that there can be a shortage of power and that unless we tighten our belts and begin practicing moderation, we endanger our collective future. Brownouts, and then blackouts, are the alternatives to conservation.

Even without the spending cutbacks, conservation is the only sane policy for a province such as Ontario with little in the way of indigenous fossil fuel resources, and all the economically feasible hydro-electric sources already harnessed. Almost 80 per cent of the fossil fuel stocks burned in Ontario Hydro's generating stations are purchased outside the province. And of that supply, 98 per cent comes from the United States.

There is yet another factor to consider in weighing the value of a conservation policy and that is the long lead times a utility needs to bring new generation units into service. Where it may take only 3 years after discovery to bring a new oil field into production and 5 years after discovery to develop a deep coal mine, it can require up to 14 years to plan, get approvals for, and build a nuclear generating plant.

Once committed to constraints,

Hydro's conservation program included posters promoting restricted use of Christmas lights and urging school children to turn off unneeded lights.



Ontario Hydro must use conservation as yet another safeguard against interruption of supply. It becomes an integral working tool, as real a factor in system planning as turbines or transmission lines.

But the eventual success of any program of conservation lies in the hands of the consumers of energy — the 2.7 million customers of Ontario Hydro and the associated municipal electrical utilities. Conservation, like brotherhood, can be preached and taught but the acid test is how it is applied in day-to-day life.

To date, the results of the program have been encouraging. Vast industrial concerns like General Motors of Canada have cut energy use through improved efficiency. That company achieved a saving of 8.9 per cent or \$6,000,000 in 1975 and recorded a 6.6 per cent reduction in 1976. But the 13,000 industrial customers in Ontario cannot bear the burden of conservation alone.

The saving of energy is everybody's business. Hydro has instituted a broad information program designed to drive the benefits home. Television and radio commercials, high school lectures and accompanying information kits, seminars for businessmen, case histories for customers and speeches to interested groups are all part of the Hydro conservation thrust. Among its employees, Hydro has launched a program which involves conservation of energy in all forms, direct and indirect, ranging from switching off lights to reducing paper consumption.

That dark gap between the 7 per cent growth rate of the past and the 1 per cent we can afford must be narrowed and closed. It represents the barrier blocking the road ahead. The Board of Directors and employees of Ontario Hydro have made a firm and unswerving commitment to conservation. What is needed now is the support of all the people of Ontario. □

"Ontario Hydro is primarily concerned with providing electric power in the Province . . ."

Ontario Hydro is a special statutory corporation without share capital which administers an electric power enterprise and has broad powers to produce, buy, and deliver electric power throughout the Province of Ontario. It was created as a financially self-sustaining body corporate under the name of The Hydro-Electric Power Commission of Ontario by an Act of the Provincial Legislature passed in 1906. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c 354 as amended.

The name of the Corporation was changed on March 4, 1974 from "The Hydro-Electric Power Commission of Ontario" to "Ontario Hydro". At the same time the form of administration of the Corporation was changed from a six-man commission to a Board of Directors comprising a Chairman, a Vice-Chairman, a President, and not more than 10 other directors. The Corporation is composed of those persons, appointed by the Lieutenant-Governor-in-Council, who from time to time comprise its Board.

One of the first organizational steps taken by the first Board of Directors was the establishment of a Corporate Office. The Corporate Office, comprising the president and three vice-presidents, concentrates on over-all corporate objectives and policies, with the day-to-day operations being the responsibility of seven general managers who report to the vice-presidents.

Ontario Hydro is primarily concerned with providing electric power in the Province by generation or purchase and delivering it in bulk to municipal utilities for resale, and to certain direct industrial customers such as pulp and paper mills, mines

and electro-chemical and metallurgical industries. The remaining primary sales are made to retail customers either in rural areas or in certain communities not served by municipal electrical utilities. Ontario Hydro also makes sales to other power systems in Canada and the United States.

In addition to supplying power, Ontario Hydro, as required by Provincial legislation, exercises certain regulatory functions with respect to the electrical service provided by municipalities. For administration purposes Ontario Hydro maintains seven regional offices in suitably located centres and 61 area offices.

The basic principle governing the financial aspect of Ontario Hydro's operations is that service is provided at cost, which is defined in The Power Corporation Act to include charges for power purchases, operation, maintenance, administration, fixed charges, and reserve adjustments. The fixed charges comprise interest, depreciation, and a provision for the retirement of debt over a 40-year period. The municipalities, operating under cost contracts with Ontario Hydro, are billed monthly at rates based on estimates of the cost of providing service throughout the year.

The Province guarantees the payment of principal and interest on all bonds and notes issued to the public by Ontario Hydro. In the case of public borrowing in the United States, the Province borrows on behalf of Hydro by issuing its own debentures and advancing the proceeds to Ontario Hydro upon terms and conditions agreed upon between the Corporation and The Treasurer of Ontario. □



ONTARIO HYDRO SYSTEM

LEGEND

	IN OPERATION	PARTIAL OPERATION	UNDER CONSTRUCTION
HYDRAULIC	●	◐	○
FOSSIL	■	◼	
NUCLEAR	▲	◀	△
HEAVY WATER PLANTS	◆		◇
ROUTES OF MAIN POWER FLOW	—		
INTERCONNECTION WITH OTHER SYSTEMS	↔		



ARIO

River

MOOSONEE

LOWER
MATTAGAMI
RIVER PLANTS

OTTER
RAPIDS

ABITIBI
CANYON

Abitibi River

UPPER
MATTAGAMI
RIVER PLANTS

TIMMINS

River

SUDBURY

MONTREAL RIVER
PLANTS

Lake Nipissing

WANAPITEI PLANTS

OTTO HOLDEN

QUEBEC

SOUTH RIVER
PLANTS

DES JOACHIMS
NPD

MUSKOKA RIVER
PLANTS

CHENAU

CHATS
FALLS

OTTAWA

BRUCE NUCLEAR
DEVELOPMENT

BARRIE

MADAWASKA PLANTS

ARNPRIOR

CORNWALL

ROBERT H.
SAUNDERS

MONTREAL

TORONTO

TRENT RIVER PLANTS

LAKEVIEW

PICKERING

RICHARD L. HEARN

KINGSTON

LENNOX

HAMILTON

LONDON

SIR ADAM BECK 1 & 2

NIAGARA FALLS

NANTICOKE

NEW YORK



Linemen practice on wooden pole at Orangeville training centre.

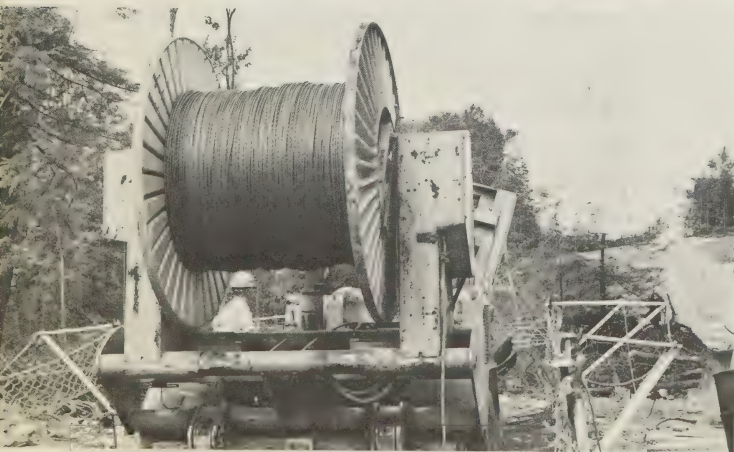
Ontario Hydro's
1,500 linemen
play vital role



Tower work is part of a lineman's course at the Orangeville centre.



"Gin pole" tower erection is the alternative to a heavy crane.



Hydro workers string a 230-kilovolt cable on Bruce-Seaforth corridor.

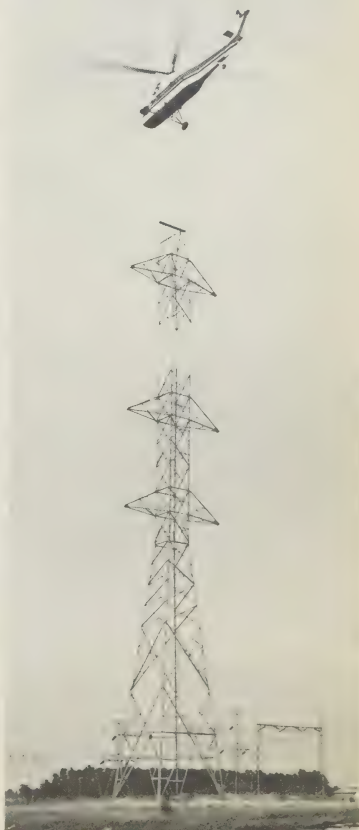
Ontario Hydro employs approximately 1,500 linemen across the province to carry out routine maintenance and conduct emergency repairs when necessary.

The linemen receive a four-year training program — nine weeks of it at the Orangeville training centre and the balance in on-the-job experience.

Live line work, which allows required maintenance to be carried out without interruption of service to customers, is handled only by linemen who have completed the four-year course and have an additional two years of work experience. Live line training is provided only for the number of linemen needed to meet Ontario Hydro's needs.

Although conductors in the Ontario Hydro system have voltages ranging from 120 to 500,000 volts, live line work is carried out only on conductors of 8,000 volts and higher. □

S58 helicopter is used in tower replacement training near Barrie.



Comparative Statistics

	1976	1975	1974	1971	1966
Dependable peak capacity ('000 kW)	19,677	18,667	15,759†	13,941	8,464
Primary peak demand ('000 kW)	15,896	14,513	13,538	11,534	8,565
Primary energy made available ('000,000 kWh)	90,853	84,222	82,696	68,134	48,056
Primary energy sales ('000,000 kWh)					
Municipalities	57,600*	54,523	51,852	41,771	28,609
Retail	12,400*	11,049	10,736	8,247	5,441
Direct	14,100*	12,588	14,829	13,727	10,255
Total	84,100*	78,160	77,417	63,745	44,305
Secondary energy deliveries ('000,000 kWh) ..	6,600*	4,918	8,078	4,087	3,697
Number of ultimate customers ('000)					
Residential	2,290*	2,239	2,190	2,052	1,855
Farm	121*	123	124	126	133
General	291*	285	279	256	200
Total	2,702*	2,647	2,593	2,434	2,188
Average annual kWh per customer					
Residential	9,600*	9,203	8,971	8,063	6,438
Farm	17,000*	15,914	15,300	13,021	9,262
General	198,000*	188,583	195,322	175,636	153,015
Average revenue per kWh (¢)					
Residential	2.20*	1.94	1.74	1.45	1.24
Farm	2.45*	2.24	2.06	1.79	1.72
General	1.60*	1.39	1.21	1.00	.83
Miles of line					
Transmission	24,211	23,741	23,282	21,915	19,342
Retail distribution	56,150	55,567	54,740	52,747	49,863
Long-term bonds and notes issued (\$'000,000)	1,539	1,601	700	501	190
Gross expenditures on fixed assets (\$'000,000)	1,326	1,442	890	507	211
Revenues (\$'000,000)					
Primary power and energy	1,320	1,027	896	607	336
Secondary power and energy	90	43	102	23	3
Assets (\$'000,000)	9,924	8,593	7,080	5,064	3,190
Staff, average for year	24,123	25,361	23,612	23,264	15,361

*Preliminary

†Major equipment failures at Pickering GS and Nanticoke GS reduced the generating capacity at the end of 1974 by one unit at Pickering and four units at Nanticoke.

FINANCIAL REPORT

Financial Review

Ontario Hydro had income of \$61 million before an extraordinary charge of \$9 million in 1976, compared to a net loss in 1975 of \$866 thousand. The net income of \$52 million was not adequate to cover the debt retirement appropriation required by The Power Corporation Act and a withdrawal of \$35 million was required from the reserve for stabilization of rates and contingencies. The extraordinary charge represents an additional write-off of costs for Bruce Heavy Water Plant "C", which was cancelled in 1976.

Total revenue from the sale of electrical power and energy increased by 32% over 1975 to \$1,410 million for the year. Revenue from sales of primary power and energy in 1976 were \$1,320 million. This was \$292 million or 28% over the previous year. This increase arose from increases in rates and in the volume of sales. Revenues from sales, by class of customer, were:

Class of Customer	Revenues in \$ million 1976	Revenues in \$ million 1975	Per Cent Increase
Municipal utilities	838	654	28
Retail customers	312	248	26
Direct customers	170	126	35
Total	1,320	1,028	28

Sales of secondary energy in 1976 amounted to \$90 million, \$47 million higher than in 1975. This increase was almost entirely the result of greater demand for secondary energy by United States utilities.

Total costs, excluding interest and before the extraordinary charge, rose from \$817 million in 1975 to \$1,030 million in 1976, an increase of 26%. Operation, maintenance, and administration costs were higher by \$27 million as a result of increases in wage and salary rates, staff levels, and prices paid for materials and services. Fuel used for electric generation increased by \$140 million in 1976, due to higher prices and an increase of 23% in the energy produced by thermal-electric generation. Nuclear agreement payback increased \$19 million and power purchased was higher by \$2 million. Depreciation costs rose \$24 million in 1976 to \$180 million.

Interest expense increased in 1976 by \$64 million to \$318 million. This represents an increase of 25% and is primarily the result of new borrowings during the year and higher interest rates.

The amount appropriated for debt retirement required by The Power Corporation Act increased by \$9 million in 1976 to \$88 million. A withdrawal of \$35 million from the stabilization of rates and contingencies reserve was required in 1976 to cover that portion of the appropriation not covered by net income for the year. A withdrawal of \$139 million from the reserve was made in 1975.

The cost of fixed assets in service and under construction increased in 1976 by \$1,298 million to a total of \$10,161 million. Major expenditures included \$709 million for generation facilities, \$197 million for transformation and transmission facilities, and \$299 million for heavy water plants and facilities. The major expenditures for generating stations were \$290 million at Bruce G.S., \$152 million at Pickering G.S., \$44 million at Lennox G.S. and \$36 million at Nanticoke G.S. At December 31, 1976 the cost of fixed assets in service and the accumulated depreciation were:

Asset Classification	In-Service Cost \$ million	Accumulated Depreciation \$ million
Generation facilities	3,974	701
Transformation and transmission facilities	1,730	356
Retail distribution facilities	665	202
Heavy water production facilities	255	44
Administration and service facilities	319	102
Total	6,943	1,405

Proceeds from issues of long-term bonds and notes during 1976 totalled \$1,539 million. Canadian currency issues amounted to \$651 million, while issues in United States currency amounted to \$900 million (Can. \$887 million). The average coupon interest rate of 1976 issues was 9.5% as compared to an average in 1975 of 9.1%. Retirement of long-term debt during the year amounted to \$252 million. Short-term notes outstanding at year-end amounted to \$129 million, a decrease of \$51 million from 1975.

Other significant changes in the financial position were increases in accounts receivable and other assets by \$57 million to \$263 million, and increases in interest and accounts payable (including the estimated liability on cancellation of the heavy water plant) by \$42 million to \$553 million. Total equity increased by \$52 million to \$1,463 million.

Funds provided from operations during 1976 increased by \$87 million to \$242 million. Financing provided a net of \$1,122 million in 1976, a decrease of \$246 million compared to 1975. The major application of these funds was for expenditures of \$1,309 million on fixed assets.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1976 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations, and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1976 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 14, 1977

CLARKSON, GORDON & CO.
Chartered Accountants

Summary of Significant Accounting Policies

The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in Canada. The significant accounting policies are described below.

Fixed assets

Fixed assets include power supply facilities (generation, transformation, transmission and distribution); administration and service facilities (land, buildings, office and service equipment); and heavy water production facilities.

The cost of additions and replacement of component units is capitalized. This cost includes direct material and labour, and overhead costs such as engineering, administration and procurement that are considered applicable to the capital construction program. The cost of commissioning generating units, less the value of energy produced during the commissioning period, is capitalized. Interest is capitalized on construction costs at effective annual rates of 9.2% in 1976 and 8.0% in 1975. Prior to 1976 the rate was based on the preceding three-year average of the cost of long-term funds borrowed. In order to more closely relate the cost of borrowings to construction expenditures, and in recognition of the increase in the size and duration of the construction program, Ontario Hydro decided, effective January 1, 1976 to refine the calculation of the rate so that it now approximates the average cost of long-term funds borrowed in the years in which the expenditures have been made for fixed assets under construction. As a result of this refinement, interest capitalized in the year ended December 31, 1976 has increased by \$17 million.

In the case of nuclear generation facilities, cost includes the cost of heavy water purchased and produced. The cost of producing heavy water includes the direct costs of production, applicable overheads, interest, and depreciation of the heavy water production facilities.

For normal retirements, the cost of assets retired less salvage proceeds is charged to accumulated depreciation with no gain or loss being reflected in operations. For unusual or premature retirements, the gains or losses on assets retired are reflected in operations.

Depreciation

Since January 1, 1971, all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates for the various classes of assets are based on the estimated service lives, which are subject to periodic review. The service lives of major asset classes are:

Generation — Hydro-electric	50 to 100 years
Generation — Thermal-electric	30 years
Transmission and distribution	25 to 50 years
Heavy water production facilities	20 years

Nuclear agreement — Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited, and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Ontario Hydro is required to make monthly payments until the year 2001 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for or withdrawal from the stabilization of rates and contingencies reserve is the amount required to stabilize the effect of abnormal cost fluctuations.

Foreign currency translation

Long-term debt payable in foreign currencies is translated to Canadian currency at rates of exchange at the time of issue. Current monetary assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange. Exchange gains or losses are credited or charged to interest expense in the statement of operations.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, benefit-based plan covering all regular employees of Ontario Hydro. The most recent actuarial valuation of the pension plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million representing an experience deficiency is being amortized over the years 1974 through 1978 and the balance of \$19 million representing the unfunded liability with respect to improved benefits is being amortized over the years 1974 through 1989. The next valuation of the plan will be based on the position at December 31, 1976 as required by the Ontario Pension Benefits Act.

The pension costs for each year include current service costs and the pro-rata share of the amount required to amortize the unfunded obligation.

Statement of Operations
for the year ended December 31, 1976

	1976	1975
	\$'000	\$'000
Revenues		
Primary power and energy	1,319,624	1,027,606
Secondary power and energy	90,278	42,989
	<u>1,409,902</u>	<u>1,070,595</u>
Costs		
Operation, maintenance, and administration	342,134	315,388
Fuel used for electric generation	392,930	253,276
Power purchased	74,156	72,274
Nuclear agreement — payback	40,432	20,896
Depreciation	180,213	155,617
	<u>1,029,865</u>	<u>817,451</u>
Income before interest and extraordinary item	380,037	253,144
Interest (note 2)	318,331	254,010
Income (loss) before extraordinary item	61,916	(866)
Extraordinary item (note 1)	9,419	60,000
Net income (loss)	<u>52,497</u>	<u>(60,866)</u>
Appropriation for (withdrawal from):		
Debt retirement as required by The Power Corporation Act ..	87,635	78,360
Stabilization of rates and contingencies	(35,138)	(139,226)
	<u>52,497</u>	<u>(60,866)</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Statement of Financial Position

as at December 31, 1976

Assets	1976	1975
	\$'000	\$'000
Fixed assets		
Fixed assets in service, at cost	6,943,457	6,198,985
Less accumulated depreciation	1,404,982	1,235,810
	5,538,475	4,963,175
Fixed assets under construction, at cost	3,217,984	2,664,119
	8,756,459	7,627,294
Current assets		
Cash and short-term investments (note 3)	113,000	144,402
Accounts receivable	203,079	157,311
Fuel for electric generation, at cost	295,300	288,646
Materials and supplies, at cost	83,526	77,892
	957,868	668,251
Other assets		
Long-term investments (note 4)	68,672	186,899
Debt discount and expense, less amounts written off	2,000	62,408
Investment in coal supply (note 5)	37,908	24,997
Long-term accounts receivable and other assets	10,000	23,452
	209,348	297,756
	9,923,675	8,593,301

See accompanying summary of significant accounting policies and notes to financial statements.

Liabilities	1976	1975
	\$'000	\$'000

Long-term debt

Bonds and notes payable (note 6)	7,502,298	6,207,733
Other long-term debt (note 7)	276,400	283,908
	<u>7,778,698</u>	<u>6,491,641</u>
Less payable within one year	1,147,519	179,659
	<u>7,631,179</u>	<u>6,311,982</u>

Current liabilities

Accounts payable and accrued charges	355,212	355,212
Short-term notes payable	128,740	180,140
Accrued interest	168,304	127,500
Long-term debt payable within one year	147,519	179,659
Estimated liability on cancellation of heavy water plant	11,479	27,834
	<u>829,207</u>	<u>870,345</u>

Equity

Equities accumulated through debt retirement appropriations ...	1,181,569	1,094,081
Reserve for stabilization of rates and contingencies	155,025	190,198
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	<u>1,463,289</u>	<u>1,410,974</u>
	<u>9,923,675</u>	<u>8,593,301</u>

On behalf of the Board



Chairman



President

Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1976

	Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
		Munici- palities	Direct Customers	Retail Customers	1976	1975
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	222,650	1,144	(6,851)	(26,745)	190,198	329,510
Appropriation (withdrawal)	(26,587)	90	314	(8,955)	(35,138)	(139,226)
Deficit recovered from municipality on annexation	—	—	—	55	55	—
Payment to Ontario Municipal Electric Association	—	(90)	—	—	(90)	(86)
Balances at end of year	<u>196,063</u>	<u>1,144</u>	<u>(6,537)</u>	<u>(35,645)</u>	<u>155,025</u>	<u>190,198</u>

Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1976

	Municipalities	Power District (Retail and Direct Customers)	Totals	
			1976	1975
	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	758,480	335,601	1,094,081	1,015,725
Add:				
Debt retirement appropriation	57,810	29,825	87,635	78,360
Annexation transfers and refunds	542	(689)	(147)	(4)
Balances at end of year	<u>816,832</u>	<u>364,737</u>	<u>1,181,569</u>	<u>1,094,081</u>

See accompanying summary of significant accounting
policies and notes to financial statements.

Statement of Changes in Financial Position for the year ended December 31, 1976

	1976	*1975
	\$'000	\$'000
Source of funds		
Operations		
Income (loss) before extraordinary item	61,916	(866)
Depreciation, a charge not requiring funds in the current year	<u>1,554,117</u>	<u>155,617</u>
	242,129	<u>154,751</u>
Financing		
Long-term debt		
Bonds and notes issued	1,539,245	1,624,113
Lease obligations assumed on head office building	—	45,000
Less retirements	<u>(252,188)</u>	<u>(205,886)</u>
	1,287,057	1,463,227
Short-term notes — (decrease)	(51,400)	(69,845)
Cash and investments — (increase)	<u>(113,334)</u>	<u>(25,545)</u>
	1,122,323	<u>1,367,837</u>
Increase in accounts and interest payable including estimated liability on cancellation of heavy water plant	<u>42,402</u>	<u>180,586</u>
	<u>1,406,854</u>	<u>1,703,174</u>

Application of funds

Net additions to fixed assets	1,429,412
Extraordinary item-loss on cancellation of heavy water plant (note 1)	60,000
Increases in fuel, materials and supplies	150,440
Increase in accounts receivable and other assets	48,504
Other items — net	<u>14,818</u>
	<u>1,406,854</u>
	<u>1,703,174</u>

*1975 figures have been reclassified to conform with
the 1976 presentation.

See accompanying summary of significant accounting
policies and notes to financial statements.

Notes to financial statements

1. Extraordinary item

During 1975, in response to the Ontario Government's publicly expressed concern about capital availability, Ontario Hydro reviewed its capital construction program. On February 11, 1976 certain specific revisions to the long-term capital construction program were announced, involving the cancellation of Bruce Heavy Water Plant "C", the deferment of proposed new generating stations, and the postponement of completion of some generating stations currently under construction. Over the next ten years these revisions are expected to reduce planned expenditures by \$7.0 billion. The cancellation of the heavy water plant, the cost of which had been estimated to be \$562 million, has resulted in extraordinary charges of \$60 million in 1975 and \$9.4 million in 1976 against income to write off the cost of preliminary construction and materials and to provide for the costs of cancellation of contracts awarded for materials and equipment.

2. Interest

Interest costs consisted of:

	1976	1975
	\$'000	\$'000
Interest on bonds, notes, and other debt	612,735	459,866
Less:		
Interest capitalized	224,348	149,197
Interest on heavy water production facilities— charged to cost of heavy water	19,875	18,538
Interest earned on investments	54,544	34,049
Net gain on redemption of bonds and sale of investments	1,187	7,622
Foreign exchange loss on redemption and translation of foreign assets and liabilities	(5,340)	(3,550)
	<u>294,614</u>	<u>205,856</u>
	<u>318,121</u>	<u>254,010</u>

3. Cash and short-term investments

	1976	1975
	\$'000	\$'000
Cash and short-term investments, with short- term investments recorded at the lower of cost or market (approximately market value), consisted of:		
Cash	9,848	8,814
Notes of, and interest bearing deposits with, banks and trust companies	216,644	108,016
Corporate bonds and notes	96,472	4,975
Government and government-guaranteed bonds	52,999	22,597
	<u>375,963</u>	<u>144,402</u>

4. Long-term investments

These investments are recorded at amortized cost and consisted of:

	1976	1975
	\$'000	\$'000
Government and government-guaranteed bonds	68,672	168,102
Corporate bonds and notes	—	18,797
	<u>68,672</u>	<u>186,899</u>

Market value of these investments at December 31, 1976 was \$58 million. (1975 — \$161 million).

5. Investment in coal supply

Ontario Hydro and United States Steel Corporation have an agreement for the development of a coal mine owned by United States Steel Corporation for the supply of 90 million tons of coal to Ontario Hydro over a thirty-year period commencing in 1977. Ontario Hydro has agreed to advance up to \$68 million for mine development and equipment, to guarantee lease payments for mine equipment and rolling stock leased by United States Steel Corporation, and to make subsequent advances for a portion of the cost of equipment replacements. Advances and associated costs, such as interest, amounted to \$38 million to December 31, 1976. These advances and associated costs are to be amortized on a tonnage basis and included as part of the cost of the coal purchased under this agreement.

6. Bonds and notes payable

Bonds and notes payable, expressed in Canadian dollars, are summarized by years of maturity and by the currency in which they are payable in the following table:

Years of maturity	1976			Weighted Average Coupon Rate	1975	
	Principal outstanding				Principal outstanding \$'000	Weighted Average Coupon Rate
	Canadian	Foreign	Total			
1976	—	—	—		172,157	
1977	125,368	14,056	139,424		136,310	
1978	173,225	55,476	228,701		227,244	
1979	145,942	10,460	156,402		148,146	
1980	112,050	178,735	290,785		255,868	
1981	235,617	94,431	330,048		—	
1- 5 years	792,202	353,158	1,145,360	6.7%	939,725	6.1%
6-10 years	570,754	818,909	1,389,663	7.6	1,237,684	7.3
11-15 years	266,252	272,428	538,680	7.1	385,975	6.0
16-20 years	678,842	286,719	965,561	8.3	416,497	8.1
21-25 years	1,548,916	625,645	2,174,561	8.9	1,988,195	8.4
26-30 years	150,000	1,138,473	1,288,473	8.9	1,239,657	8.8
	<u>4,006,966</u>	<u>3,495,332</u>	<u>7,502,298</u>		<u>6,207,733</u>	
Currency in which payable						
Canadian dollars			4,006,966		3,565,230	
United States dollars			3,248,187		2,392,984	
West German Deutsche marks			132,484		134,858	
Swiss francs			114,661		114,661	
			<u>7,502,298</u>		<u>6,207,733</u>	

(1) Bonds and notes payable in United States dollars include \$2,250 million (1975 — \$2,282 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario issues sold in the United States on behalf of Ontario Hydro. Except for these issues, all bonds and notes payable are guaranteed as to principal and interest by the Province of Ontario.

(2) Long-term bonds and notes payable in foreign currencies are translated to Canadian currency at rates of exchange at time of

issue. If translated at year-end rates of exchange, the total Canadian dollar liability would be increased (decreased) by a net of:

	1976 \$'000	1975 \$'000
United States dollars	(485)	(5,205)
West German Deutsche marks	47,142	34,183
Swiss francs	21,431	13,478
	<u>68,088</u>	<u>42,456</u>

7. Other long-term debt

Other long-term debt consisted of:

	1976 \$'000	1975 \$'000
(a) The balance due to Atomic Energy of Canada Limited for the purchase of Bruce Heavy Water Plant "A". Under the purchase agreement, Ontario Hydro pays equal monthly instalments of blended principal and interest to December 28, 1992, with interest at the rate of 7.795%	232,176	239,300
(b) Capitalized lease obligation for the head office building at 700 University Avenue, Toronto. The lease obligation is for the 30-year period ending September 30, 2005, payable in United States dollars at an effective interest rate of 8%	44,224	44,608
	<u>276,400</u>	<u>283,908</u>

Payments required on the above debt, exclusive of interest, will total \$48 million over the next five years. The amount payable within one year is \$8.1 million (1975 — \$7.5 million).

8. Anti-Inflation program

Effective October 14, 1975 the Government of Canada passed the Anti-Inflation Act (Canada). Subsequently, the Province of Ontario entered into an agreement with the Federal Government whereby Ontario Hydro is subject to the guidelines under this Act only in the matter of employee compensation. Management is of the opinion that Ontario Hydro is in compliance with the requirements of the anti-inflation legislation in so far as employee compensation is concerned. Ontario Hydro's prices for electricity will continue to be reviewed by the Ontario Energy Board.

Pension and Insurance Fund Statement of Assets as at December 31, 1976

	1976 \$'000	1975 \$'000
Fixed income securities		
Government and government-guaranteed bonds	110,045	119,873
Corporate bonds	111,791	108,299
First mortgages	228,510	170,666
Total fixed income securities	450,294	398,838
Equities — corporate shares	227,934	189,512
Cash and short-term investments	170	170
Total investments	682,584	588,520
Accrued interest	7,830	5,595
Receivable from Ontario Hydro	2,450	5,372
	<u>692,864</u>	<u>599,487</u>

Notes

1. The most recent actuarial valuation of the pension plan, at December 31, 1973, indicated an unfunded obligation of Ontario Hydro of approximately \$55 million. Of this amount, \$36 million representing an experience deficiency is being amortized over the years 1974 through 1978 and the balance of \$19 million representing the unfunded liability with respect to improved benefits is being amortized over the years 1974 through 1989. The next valuation of the pension plan

will be based on the position at December 31, 1976 as required by the Ontario Pension Benefits Act.

2. In the above statement of assets, bonds are included at amortized cost, first mortgages at balance of principal outstanding and shares at cost. Total bonds and shares at December 31, 1976 with a book value of \$450 million had a market value of \$438 million. (1975 book value \$418 million — market value \$372 million).

Auditor's Report

(Pension and Insurance Fund)

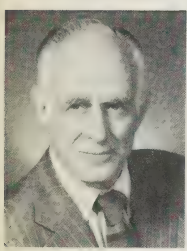
We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1976. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1976.

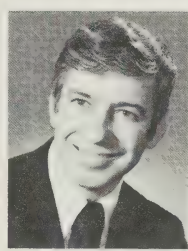
Toronto, Canada
March 14, 1977

CLARKSON, GORDON & CO.
Chartered Accountants

Ontario Hydro Vice-Presidents & General Managers



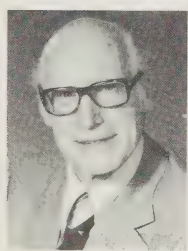
H. J. SISSONS
Vice-President
Distribution



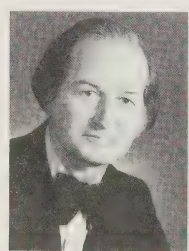
M. NASTICH
Vice-President
Resources



P. G. CAMPBELL
Acting Vice-President
Engineering & Operations



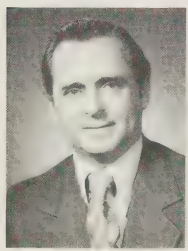
H. A. JACKSON
Acting General Manager
Design & Construction



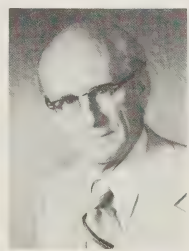
L. G. McCONNELL
General Manager
Operations



G. R. CURRIE
General Manager
Regions & Marketing



W. D. GILLMAN
General Manager
Computers



F. W. GOMER
General Manager
Finance



G. M. McHENRY
General Manager
Personnel



W. C. CUNNINGHAM
General Manager
Services



H. A. SMITH
Vice-President
Special Assignments

Ontario Hydro Regional Managers



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Central Region
5760 Yonge St.
Willowdale, M2M 3T7



T. E. FLINN
Eastern Region
420 Dundas St. E.
Belleville, K8N 5C3



P. J. GARLOUGH
Georgian Bay Region
93 Bell Farm Road
Barrie, L4M 1H1



R. S. GRIFFIN
Niagara Region
Box 157, 1053 Main St. W.
Hamilton, L8N 3B9



L. A. COLES
Northeastern Region
Box 3060, 590 Graham Drive
North Bay, P1B 8L4



G. E. PATTERSON
Northwestern Region
34 Cumberland St. N.
Postal Station "P"
Thunder Bay, P7A 4L5

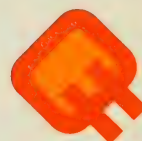


E. G. BAINBRIDGE
Western Region
1075 Wellington Rd. S.
London, N6A 4P2

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1977
Ontario Hydro Annual Report



Ontario Hydro

Head Office
700 University Avenue, Toronto, M5G 1X6

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Research Officer,
National Research Council

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President, Ontario Hydro

†**Robert H. Hay**, Kingston
Member, Kingston Public Utilities Commission

***Allen T. Lambert**, Toronto
Chairman
The Toronto-Dominion Bank

J. Conrad Lavigne, Timmins
President, Mid Canada Television System

***Philip B. Lind**, Toronto
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Rogers Cable Communications Ltd.

Sister Mary, Toronto
Executive Director,
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***J. Dean Muncaster**, Toronto
President and Chief Executive Officer
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†**Robert M. Schmon**, St. Catharines
President and Chief Executive Officer
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Former Ontario Minister of Agriculture
and Food

†**Robert B. Taylor**, F.C.A., Toronto
Chairman, Ontario Hydro

***Robert J. Uffen**, F.R.S.C., Kingston
Vice-Chairman, Ontario Hydro
Dean, Faculty of Applied Science
Queen's University

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Robert J. Uffen, F.R.S.C. Vice-Chairman

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Vice-President, Resources

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Vice-President, Special Assignments

P.G. Campbell
Acting Vice-President, Engineering & Operations

William E. Raney, Q.C.
Secretary and General Counsel

††Chairman of the Audit Committee

†Member of the Audit Committee

*Member of the Finance Committee

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Report of the Board of Directors of Ontario Hydro for the year 1977

To the Honorable
Reuben Baetz
Minister of Energy



Hydro Chairman Robert Taylor inspects winter work at Thunder Bay GS extension.

Larger export power sales, reductions in the projected cost of operation, maintenance and administration, and the continued outstanding performance of the Pickering nuclear station were among the chief factors that pushed 1977 revenues \$122 million above the original forecasts.

The probability that these welcome but unexpected developments would produce excess revenue for the year was pointed out by Ontario Hydro during the July rate hearings of the Ontario Energy Board. Since it obviously exceeded the anti-inflation guidelines established for Hydro by the provincial government, the Board of Directors decided that the extra revenue would be returned to customers, with interest, in the form of rebates on their bills over the 12 months of 1978.

Following the Ontario Energy Board's review of the 1978 rate proposal, the Board of Directors authorized an increase in wholesale or bulk power rates effective January 1, 1978, averaging 9.5 per cent, to cover the forecast costs of supplying wholesale power to municipal utility and large industrial customers. This increase is very close to that recommended by the OEB. The rebate in 1978 bills will effectively reduce the increase to about 2 per cent. At the municipal level, Ontario householders will be paying about 5 per cent more for electricity in 1978. The 800,000 retail customers served by the Ontario Hydro rural system will be paying about 5.7 per cent more.

The favourable operating results experienced by Hydro in 1977 were due to the special factors noted above, rather than to the performance of the

economy. Real economic growth in Canada last year was substantially below full potential. This less than satisfactory economic performance was one of the factors that contributed to a growth in energy consumption for the year of only 2.2 per cent — the smallest annual increase in 33 years.

During the fourth quarter, both peak and energy demands dropped below those reached a year earlier. This could not be attributed entirely to the economy; weather conditions were not a factor either, as they were similar in both years. These facts suggest that the two extraordinarily large rate increases in 1976 and 1977, reinforced by the vigorous conservation efforts of Ontario Hydro, the municipal utilities, the Ministry of Energy and other agencies, are leading to new prudence in consumption.

Forecast lower

The 1978 Load Forecast, which was approved by the Board in February of this year, reflected these developments in a downward revision in both the level of demand and also its rate of growth. The forecast now predicts average annual growth of 5.5 per cent until 1987, followed by a slow decline to about 4.5 per cent by the end of the century.

Last year's forecast was for an annual growth rate of 6.5 per cent. Historically, electricity demand in Ontario has grown at close to 7 per cent a year — doubling every 10 years. A 5.5 per cent growth rate means demand will double in 12.75 years.

If the forecast growth becomes a reality — and there are a large number of uncertainties for the longer term — then the peak demand expected in 1985 will be about 3,700,000 kilowatts lower than previously forecast. This means that about 2,000,000 kilowatts less generating capacity will be needed than previously estimated. The difference of 1,700,000 kilowatts represents the amount of generating capacity needed to re-establish the normal level of system reliability, which had been a casualty of previous cutbacks in the construction program.

In the light of this new data, an intensive review of the current expansion program has been undertaken. Detailed consideration is being given to a wide range of options, all of which will be assessed in order to achieve results that will be of maximum benefit to the people of Ontario.

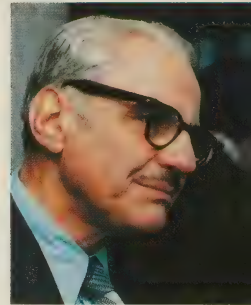
The solution will not be simply a matter of scaling down planned expansion to match forecast demand. There is always a tendency to under-forecast during periods of slow economic growth and the extent and firmness of apparent trends in patterns of consumption are by no means clear. Without an adequate, reliable supply of electricity the economy cannot improve, and the dozen or so years needed to get a new power station from planning — through approvals and construction — to operation make it impossible to catch up quickly if forecasts prove to be low.

There are also strong economic arguments for maintaining momentum in the nuclear program, if only because of the positive effects on the cost of electricity to customers. In 1977, for the first time, nuclear energy produced more than one-quarter of the total electricity generated by Ontario Hydro. For the second consecutive year, unit 3 at Pickering recorded the highest productivity in the world, at 95.6 per cent. Of the 82 largest nuclear reactors in the world, the four Pickering units ranked first, third, fourth and sixth in 1977.

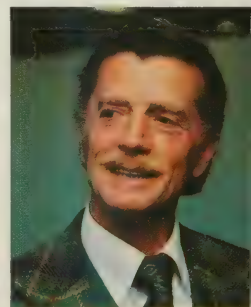
Nuclear waste disposal

While the outstanding success of Ontario's nuclear program has been amply demonstrated, the Hydro Board of Directors is acutely conscious that if public confidence in nuclear power is to be retained, techniques for managing irradiated fuel must be publicly demonstrated to be environmentally safe. During 1977 Dr. Kenneth Hare of the University of Toronto completed a study for the federal government on the disposal of this by-product of nuclear generation and urged early decisions by government so that scientists and engineers can begin testing and demonstrating storage techniques. Early in 1978, Dr. Robert Uffen, Professor of Geophysics and Dean of Applied Science at Queen's University, completed a status report on alternative proposals for the storage, reprocessing, and ultimate disposal of used fuel from CANDU reactors. While noting the severity of technical problems and the need for greater research, Dr. Uffen, who is also Vice Chairman of Hydro's Board of Directors, concluded that the problems of storage and permanent disposal appear to be solvable. He observed that too little has been done in Canada, as elsewhere, in respond-

ONTARIO HYDRO BOARD OF DIRECTORS



William A. Stewart
Former Minister of Agriculture
Province of Ontario



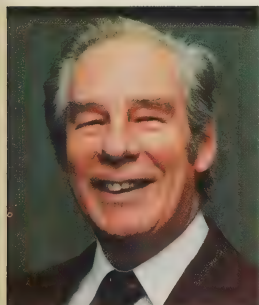
J. Conrad Lavigne
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Robert B. Taylor
Chairman



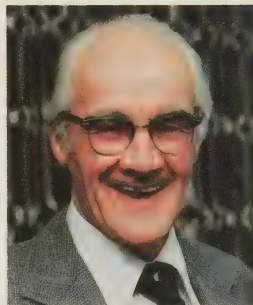
Douglas J. Gordon
President



William Dodge
Former Secretary-Treasurer
Canadian Labour Council



Sister Mary
Executive Director
St. Michael's Hospital



Robert H. Hay
Kingston Public Utilities
Commission



Allen T. Lambert
Chairman
Toronto Dominion Bank



Arthur J. Bowker
National Research Council



Philip B. Lind
Vice-President and Secretary
Rogers Cable
Communications Ltd.



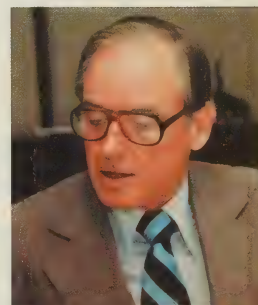
J. Dean Muncaster
President and
Chief Executive Officer
Canadian Tire Corporation



Robert M. Schmon
President and
Chief Executive Officer
Ontario Paper Company
Limited



Robert J. Uffen
Vice-Chairman, Ontario Hydro
Dean, Faculty of
Applied Science
Queen's University



William E. Raney
Secretary and
General Counsel
Ontario Hydro

ing to the legitimate questions and objections of a concerned public and emphasized the need for public participation in assessing alternative plans.

The Ministry of Energy is actively pursuing the development of a joint proposal by the Government of Ontario and the Government of Canada which would commit both governments and their agencies, Ontario Hydro and Atomic Energy of Canada, to develop and demonstrate the safe disposal of irradiated fuel.

Major contracts negotiated

In December, a contract was signed with Denison Mines Limited for a long-term supply of uranium, followed in January 1978, by the signing of a contract with Preston Mines Limited. The contracts, which were subject to government approval, culminated four years of negotiations with the Elliot Lake producers to secure uranium to fuel Ontario's nuclear reactors. The two contracts, the largest commercial uranium transactions ever negotiated, call for delivery of 90,000 metric tons (99,000 tons) of uranium oxide between 1980 and 2020, which quantities can be adjusted by resale or curtailment if requirements should diminish. That uranium represents the energy equivalent of 1.45 billion metric tons (1.6 billion tons) of coal.

The Denison and Preston contracts may well be the most significant ones ever negotiated by Ontario Hydro since they commit a substantial part of the province's known uranium resources to the electric power requirement of the people of Ontario over the next 40 years. The contracts were approved by the provincial cabinet in February, 1978, after a thorough study by government and scrutiny by the Legislature's Select Committee on Hydro Affairs during 18 days of public hearings.

The same Select Committee, during 1978, will also examine the heavy water plant construction at the Bruce

Nuclear Power Development, monitor the implementation of recommendations made by the 1976 Select Committee on Hydro rates, and review Ontario Hydro's commitment to nuclear energy.

In its deliberations, the Committee is expected to have the benefit of an interim report on nuclear energy from the Royal Commission on Electric Power Planning, which is due in June. That Commission, headed by Dr. Arthur Porter, which continued its debate-stage hearings, was one of four public inquiries into Hydro affairs over the course of 1977. The Aluminum Wiring Inquiry, which concluded its public hearings early in 1978, required extensive participation by Ontario Hydro staff. Its report is expected by mid-year. The Ontario Energy Board completed its review of Hydro's 1978 rate proposal during the year and also began a separate series of public hearings on the overall subject of costing and pricing of electricity in Ontario. The latter hearing is still underway.

Progress on the restructuring of municipal utilities to rationalize and integrate local distribution systems within regional government structures continued during the year. At the beginning of 1978, the number of municipal utilities in Ontario stood at 341, compared to 352 at the beginning of 1977. The Board recognizes the birth pains that are an unavoidable part of the restructuring process. The new utilities are sturdy and healthy entities. They are doing an outstanding job in pulling together the staff they need and getting down to business.

Special appreciation

The Hydro Board wants to express here a special note of appreciation to the municipal utilities and their associations (the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities) for their assistance and co-operation during the year. They have responded quickly and effectively to the chal-

lenge of conservation, which remains an essential issue even with lower forecasts of growth in consumption.

The Board also wishes to acknowledge the help and support of the ministries and agencies of government with which the Corporation deals, in particular the Minister of Energy and his staff.

To end this report on a happy and positive note, the Board once again records its admiration and thanks for the dedicated efforts of Hydro employees. Without those efforts the many achievements of the year, recorded and unrecorded, would not have come to pass.

**On behalf of the Board,
Robert B. Taylor, Chairman.**

Hydro generation meets demands

A lagging economy, improved conservation practices and substantial rate increases during 1976 and 1977 were the principal factors contributing to the smallest increase in demand for electrical energy in 33 years — only 2.2 per cent over 1976.

While primary energy demand rose only from 90,853 million kilowatt-hours to 92,855 million, 1977 recorded some memorable milestones in the manufacturing of electricity in Ontario.

Paramount among these was the ascending role of nuclear power in Ontario Hydro's production system. A breakdown of 1977 energy generation by source figures shows that for the first time since their intro-

duction into the system in 1962, nuclear plants produced more than one quarter of Hydro's generation.

The dramatic rise in nuclear-fuelled production — from 0.1 per cent of Hydro's total generation in 1962 to 27.2 per cent in 1977 — can be attributed to the outstanding success of the CANDU system, and particularly the Pickering generating station.

The total unit energy cost for Pickering during 1977 was 9.1 mills per kilowatt-hour, or approximately one-half of the cost of producing electricity under similar conditions from Hydro's most efficient coal-fired plant, Lambton generating station, near Sarnia. (One mill equals one-tenth of a cent.)

The year 1977 also saw Ontario Hydro record an all-time peak demand of 15,901 megawatts on January 18.

The dependable peak capacity in December reached 21,347 megawatts — 8.5 per cent above the comparable peak of the previous year.

Availability of energy in Ontario and the need for assistance by American utilities resulted in total export sales to the United States climbing to a record 8,399 million kilowatt hours in 1977, more than double that of 1976. Total export sales in 1977 produced a gross revenue of \$205.8 million, compared to \$86.8 million in 1976.



Charged with Hydro's overall corporate objectives and policies are members of the Corporate Office. Shown, left to right, are: P. G. Campbell, Acting Vice-President, Engineering & Operations; H. A. Smith, Vice-President, Special Assignments; Milan Nastich, Vice-President, Resources; Douglas J. Gordon, President; H. J. Sissons, Vice-President, Distribution.

Energy made available: 1977

	1977 Millions of kW-h	1976 Millions of kW-h	% Change Over 1976	% of Total 1977	% of Total 1976
Hydraulic	33,546	35,195	-4.7	32.4	36.1
Thermal (coal)	26,309	23,021	14.3	25.5	23.6
Thermal (natural gas)	4,051	4,483	-9.6	3.9	4.6
Thermal (oil)	1,564	2,879	-45.7	1.5	2.9
Thermal (nuclear)	24,488	16,046	52.6	23.7	16.5
Total generation	89,958	81,624	10.2	87.0	83.7
Energy received	13,436	15,854	-15.3	13.0	16.3
Total energy made available	103,394	97,478	6.1	100.0	100.0

Research continues in many fields

A major program initiated by Ontario Hydro in 1974 to develop a heat pump suitable for severities of the Canadian climate continues at Hydro's research center and has been augmented by funds from the Canadian Electrical Association.

Utilizing a newly completed test laboratory that can simulate every type of Canadian environmental condition, design of the prototype heat pump is essentially complete and construction of the unit is now in progress. The scheduled completion date is June 1979, following which 12 months of field trials will be required.

Heat pumps can extract up to three units of heat from outside air, which is solar heat, for each unit of electricity consumed, thus representing substantial savings in energy use.

In a similar field Hydro researchers are testing a model of a rotating heat-reclaiming device, called a "thermal wheel" that reclaims heat from the exhaust system of a residence and uses it to heat outside air required for ventilation purposes.

In co-operation with the Ministry of Energy, research on solar-assisted water heaters continued, with

several commercial units being evaluated. Development of wind generators to supply part of the power requirements in isolated windy areas also continued in 1977.

Hydro researchers are also working on two new heavy-water processes that have the potential of replacing the present hydrogen-sulphide process. One involves distilling water, using the waste heat from generating stations as the energy source.

The other uses a laser light to select deuterium-containing molecules from abundant hydrogen-containing molecules.



Hydro researcher explores the use of laser light as an economic alternative to present process of producing heavy water.

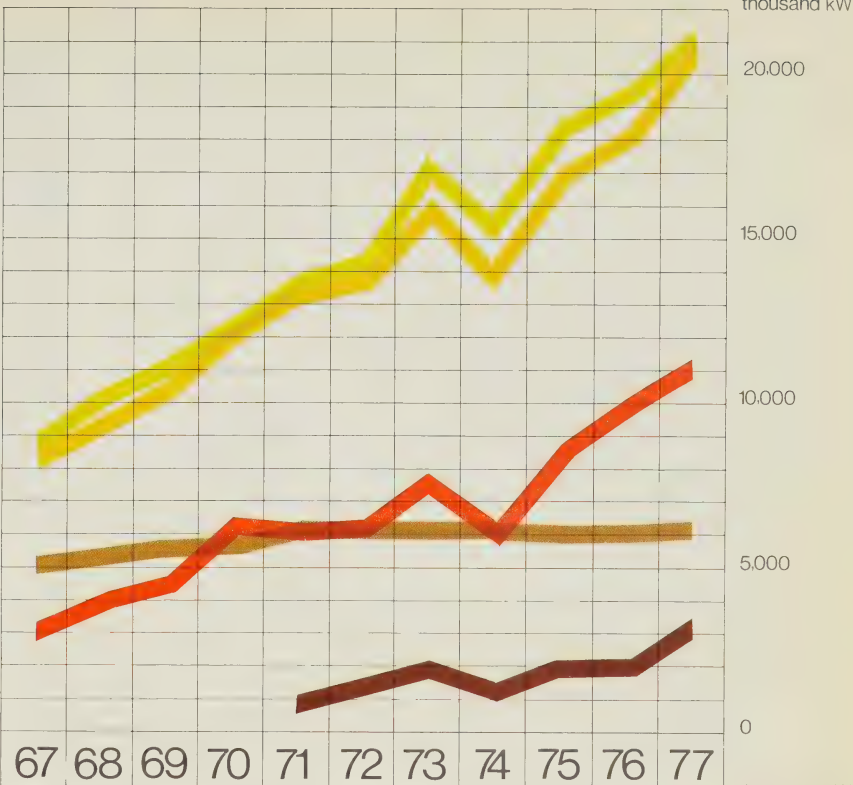
Dependable peak capacity of resources

total generated and purchased
total in ontario hydro stations

hydro-electric

fossil

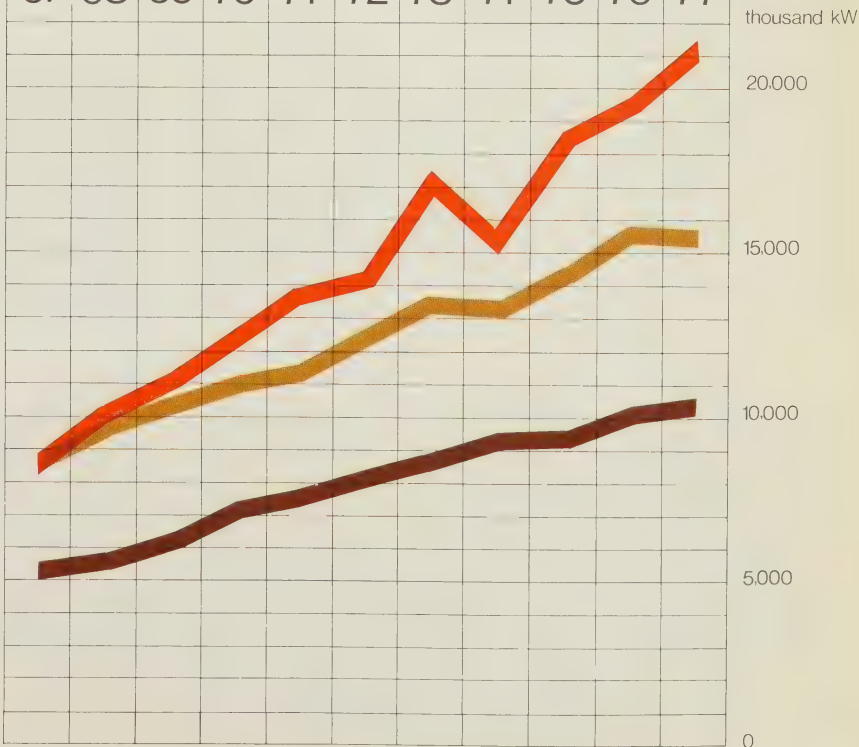
nuclear



Growth in demands and resources

dependable peak capacity
December primary peak demand

average hourly demand



Conservation produced dramatic savings

Planning launched in 1977 by Ontario Hydro's energy conservation division will see two field trials involving load management systems get underway this year.

Load management, the control of customer's load to reduce demands on the utility and so reduce their costs, has a significant potential to lessen the need for thermal generation capacity and assist in maintaining reliable service during system emergencies.

One trial will involve a large municipal utility and will obtain experience with recently developed sophisticated hardware for controlling distribution system components and customer loads and for meter reading. The other trial will involve a small-to-medium municipal utility and will obtain experience with the AM radio control system developed by Hydro's research division.

Industrial surveys in manufacturing plants were continued throughout 1977, with many plants achieving dramatic savings in con-

sumption. Case studies developed with many large retail corporations indicated that impressive financial savings can be recorded by recycling waste heat and reducing lighting levels, with no impact on consumer sales. One pilot study at an A&P market in Toronto recorded a reduction in electrical consumption of 43,400 kilowatt-hours, simply by changing lighting times, reducing light levels and recovering waste heat from compressors.

And Ontario Hydro's aggressive in-house TRIM program proved in 1977 that the Corporation practices what it preaches in the matter of conservation. Targeted for a reduction in total energy consumption of 10 per cent in 1977, the program across the Corporation achieved a reduction of 12.5 per cent. This included energy used for environmental control and lighting of buildings which was reduced in 1977 by 16 per cent (102 million kW.h), while a conservative estimate of 1977 fuels savings in



The search continues at Ontario Hydro for more efficient alternatives to incandescent light sources.

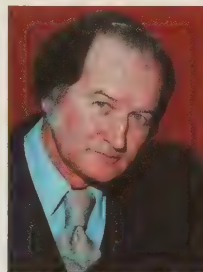
transport and work equipment is 4 per cent (300,000 gallons).

The 1978 energy reduction objective of the TRIM program is a further 6 per cent or 52 million kilowatt-hours.

Ontario Hydro General Managers



H. A. Jackson
Acting General Manager
Design & Construction



L. G. McConnell
General Manager
Operations



G. R. Currie
General Manager
Regions & Marketing



W. D. Gillman
General Manager
Computers



F. W. Gomer
General Manager
Finance



G. M. McHenry
General Manager
Personnel



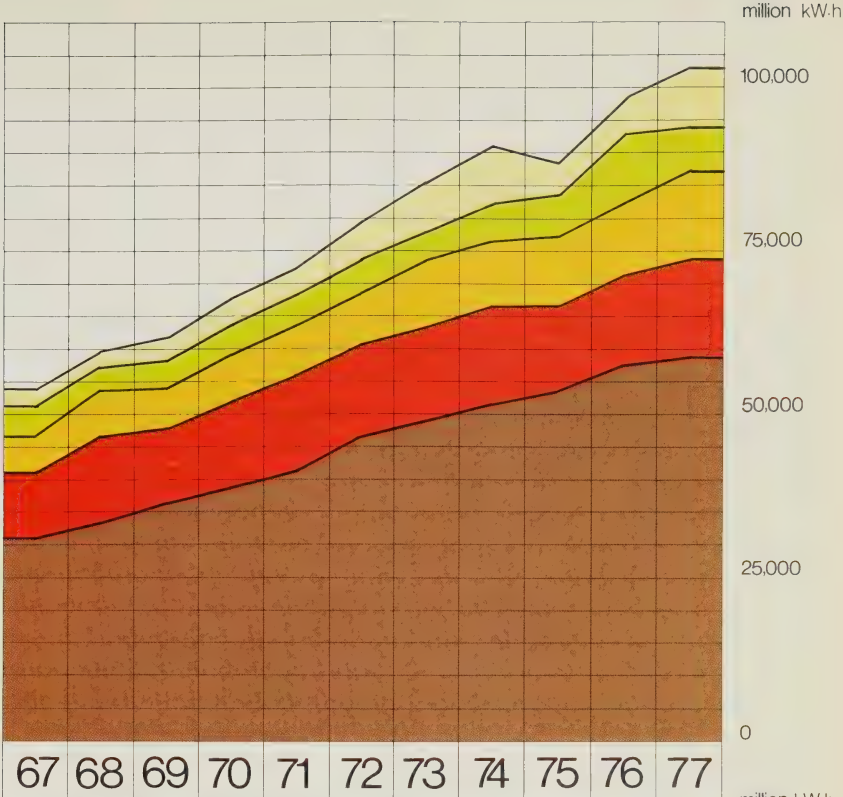
W. C. Cunningham
General Manager
Services



H. E. Kennedy
Deputy General Manager
Services

Disposal of energy

secondary sales
 losses and miscel.
 sales to retail customers
 sales to direct customers
 sales to municipalities



Energy made available

purchased
 fossil
 hydro-electric
 nuclear



Contracts ensure long-term fuel supplies

On February 28, 1978 Ontario Hydro received provincial government endorsement of entry into two uranium supply contracts which will meet most of the needs of operating and committed nuclear

generating stations through the year 2000 and beyond.

The contracts, with Denison Mines Limited and Preston Mines Limited, call for the delivery of 90 million kilograms (198 million

pounds) of uranium oxide (U_3O_8) beginning in 1980 and through the year 2020. In Denison's case, the price to be paid is a Base Price, composed of the cost of production plus \$5 per pound, plus half the difference between the Base Price and a Negotiated Price, which is intended to reflect world market conditions in the year of delivery. In Preston's case, the price is the Base Price plus one-third of the way to the Negotiated Price. Value of the uranium oxide in present-day dollars is estimated to be some \$7 billion.

Negotiations for uranium supplies began in 1974 after Hydro had sought proposals from every producer and potential producer known to have uranium reserves in Canada. Under the two agreements, Hydro would make prepayments totalling an estimated \$339 million (in 1975 dollars) to allow the two companies to expand their facilities, creating direct, continuing employment of approximately 2,600 jobs in the Elliot Lake area.

Measures to secure a steady supply of western Canadian coal continued when agreements for rail and vessel service, terminalling facilities and purchase of rolling stock were executed during the year. Initial shipments of western Canadian coal using the integrated transportation system are expected to be made in July of 1978.

Coal deliveries to generating stations from U.S. mines totalled 9.1 million megagrams (10 million tons), 25% greater than in 1976. Supplementary spot U.S. coal purchases were made during the year to compensate for early production shortfalls and in anticipation of the United Mine Workers strike in December.

First deliveries were received in October, 1977 from the U.S. Steel Corporation's Cumberland coal mine in western Pennsylvania under Hydro's 30-year contract with that company for 82 million metric tons (90 million tons) of coal. The mine is expected to reach full production in late 1979.



Artificial contamination tests at sub-zero temperatures in Ontario Hydro's environmental test chamber determine the voltage withstand strength of new suspension insulation developed for compact transmission lines.

Financial Review

Ontario Hydro's 1977 operating results showed significant improvement over 1976. The net income of \$194 million for 1977 was \$141 million greater than the 1976 net income. Total 1977 revenues of \$1,969 million exceeded amounts allowed within the spirit and intent of the Anti-Inflation program by \$122 million. These excess revenues, together with interest, will be applied to reduce customers' bills in 1978.

Revenues from sales of primary power and energy in 1977 were \$1,759 million. This was \$439 million or 33% higher than the previous year. This increase was a result of increases in rates and in the volume of sales. Revenues from sales, by class of customer, were:

Class of Customer	Revenues in \$ million 1977	Revenues in \$ million 1976	Per Cent Increase
Municipal utilities	1,108	838	32
Retail customers	407	312	30
Direct customers	244	170	44
TOTAL	1,759	1,320	33

Revenues from sales of secondary energy in 1977 amounted to \$210 million, \$120 million or 133% higher than in 1976. This increase was almost entirely the result of greater demand for secondary energy by United States utilities.

Total costs, excluding interest, rose from \$1,030 million in 1976 to \$1,250 million in 1977, an increase of 21%. Operation, maintenance and administration costs were higher by \$72 million as a result of increases in wage and salary rates, staff levels, and prices paid for materials and services. Fuel used for electric generation increased by \$56 million in 1977, due to higher prices and the continued growth in reliance upon thermal electric generation. Charges for energy produced by generating units during commissioning increased from \$8 million in 1976 to \$52 million in 1977 due mainly to units being commissioned for service at the Bruce generating station. Payments required under the nuclear agreement payback, associated with the Pickering generating station, increased by \$9 million. In 1977, power purchased was higher by \$2 million. Depreciation costs rose \$36 million in 1977 to \$216 million, largely as the result of new units being placed in service at Bruce, Lennox and Nanticoke generating stations.

Interest expense increased in 1977 by \$86 million. This represents an increase of 27% over 1976 and is primarily the result of new borrowings during the year and foreign interest payments made at higher rates of exchange.

The amount of net income appropriated for debt retirement as required by The Power Corporation Act, increased by \$10 million in 1977 to \$98 million. In addition, in 1977, \$96 million of net income was appropriated for the stabilization of rates and contingencies. In contrast, in 1976, a withdrawal of \$35 million from the reserve for stabilization of rates and contingencies was made.

Net additions to fixed assets in 1977 were \$1,413 million, increasing fixed assets in service and under construction to \$11,561 million. Major capital expenditures in 1977 included \$763 million for generation facilities, \$237 million for transformation and transmission facilities, and \$312 million for heavy water plants and facilities. The major expenditures for generating stations were \$198 million at Bruce G.S., \$258 million at Pickering G.S., \$44 million at Nanticoke G.S., \$44 million at Thunder Bay G.S., and \$30 million at Wesleyville G.S. At December 31, 1977 the costs of fixed assets in service and under construction were:

Asset Classification	In-Service Cost \$ million	Under Construction Cost \$ million
Generation facilities	5,224	1,812
Transformation and transmission facilities	1,872	377
Retail distribution facilities	710	4
Heavy water production facilities	267	939
Administration and service facilities	350	6
TOTAL	8,423	3,138

Funds provided from operations during 1977 were \$409 million while financing provided a net of \$974 million in 1977. Compared to 1976, these were an increase of \$167 million and a decrease of \$148 million respectively. In addition, increases in interest and accounts payable amounted to \$100 million in 1977.

Proceeds from issues of long-term bonds and notes during 1977 totalled \$1,407 million. Canadian currency issues amounted to \$754 million, while issues in United States currency amounted to \$625 million (Can. \$653 million). The average coupon interest rate of 1977 issues was 8.8% as compared to an average in 1976 of 9.5%. Retirement of long-term debt during the year amounted to \$277 million. Short-term notes outstanding at year-end amounted to \$45 million, a decrease of \$84 million from 1976.

Major applications in addition to the expenditure of \$1,413 million on fixed assets were increases in fuel, materials and supplies of \$78 million, increases in advance payments for fuel supplies of \$57 million and increases in accounts receivable and other assets of \$57 million.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1977 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1977 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 13, 1978

CLARKSON, GORDON & CO.
Chartered Accountants

Summary of Significant Accounting Policies

The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in Canada. The significant accounting policies are described below.

Fixed assets

Fixed assets include power supply facilities (generation, transformation, transmission and distribution); administration and service facilities (land, buildings, office and service equipment); and heavy water production facilities.

The cost of additions and replacement of component units is capitalized. This cost includes direct material and labour, and overhead costs such as engineering, administration and procurement that are considered applicable to the capital construction program. The cost of commissioning generating units, less the value attributed to energy produced during the commissioning period, is capitalized. Interest is capitalized on construction costs at effective annual rates of 9.4% in 1977 and 9.2% in 1976. These rates approximate the average cost of long-term funds borrowed in the years in which the expenditures have been made for fixed assets under construction.

In the case of nuclear generation facilities, cost includes the cost of heavy water purchased and produced. The cost of producing heavy water includes the direct costs of production, applicable overheads, interest, and depreciation of the heavy water production facilities.

For normal retirements, the cost of assets retired less salvage proceeds is charged to accumulated depreciation with no gain or loss being reflected in operations. For unusual or premature retirements, the gains or losses on assets retired are reflected in operations.

Depreciation

Since January 1, 1971, all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates for the various classes of assets are based on the estimated service lives, which are subject to periodic review. The service lives of major asset classes are:

Generation — Hydro-electric	50 to 100 years
Generation — Thermal-electric	30 years
Transmission and distribution	25 to 50 years
Heavy water production facilities	20 years

Nuclear agreement — Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Ontario Hydro is required to make monthly payments until the year 2001 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Commissioning energy

Revenues from the sale of power and energy include revenues from energy produced by generating units during the commissioning period. A charge is included in the cost of operations for the value attributed to the energy produced during the commissioning period. This charge is equivalent to the operating and fuel costs of producing the same quantity of energy at generating units displaced because of the commissioning activity. As explained under Fixed Assets, the cost of commissioning generating units, less the value attributed to the energy produced during the commissioning period, is capitalized.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for or withdrawal from the stabilization of rates and contingencies reserve is an amount established to maintain a sound financial position or to stabilize the effect of abnormal cost fluctuations.

Foreign currency translation

Long-term debt payable in foreign currencies is translated to Canadian currency at rates of exchange at the time of issue. Current monetary assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange. The resulting translation gains or losses, together with realized exchange gains or losses, are credited or charged to interest expense in the statement of operations.

Advance payments for fuel supplies

As part of its program to ensure the adequate supply of fuels for its generating stations, Ontario Hydro has entered into long-term contracts for the supply of coal, oil and uranium. Where these contracts require Ontario Hydro to make payments in advance of product delivery, the prepayments and associated costs such as interest are carried in the accounts as advance payments for fuel supplies. These advance payments are to be amortized as part of the cost of the fuels delivered under the contracts or are to be recovered over periods which do not exceed the life of the contracts.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, defined benefit plan covering all regular employees of Ontario Hydro. The pension costs for each period include current service costs and amounts required to amortize any unfunded obligation. The most recent actuarial valuation of the plan, at December 31, 1976, reported an unfunded obligation of Ontario Hydro of approximately \$143 million. Of this amount, \$105 million, representing an experience deficiency and deficits resulting from changes in actuarial assumptions, is being amortized over the years 1977 through 1981. The balance of \$38 million, representing an unfunded liability with respect to improved benefits, is being amortized over the years 1977 through 1991.

**Statement of Operations
for the year ended December 31, 1977**

	1977	1976
	\$'000	\$'000
Revenues		
Primary power and energy	1,759,041	1,319,624
Secondary power and energy	210,046	90,278
	<u>1,969,087</u>	<u>1,409,902</u>
Less excess revenues (note 1)	122,093	—
	<u>1,846,994</u>	<u>1,409,902</u>
Costs		
Operation, maintenance and administration	414,307	342,134
Fuel used for electric generation (note 10)	441,902	385,382
Power purchased	75,842	74,156
Commissioning energy (note 10)	52,322	7,548
Nuclear agreement — payback	49,643	40,432
Depreciation	215,601	180,213
	<u>1,249,617</u>	<u>1,029,865</u>
Income before interest and extraordinary item	597,377	380,037
Interest (note 2)	<u>403,828</u>	<u>318,121</u>
Income before extraordinary item	193,549	61,916
Extraordinary item (note 3)	<u>—</u>	<u>9,419</u>
Net income	<u><u>193,549</u></u>	<u><u>52,497</u></u>
Appropriation for (withdrawal from):		
Debt retirement as required by The Power Corporation Act ...	98,078	87,635
Stabilization of rates and contingencies	95,471	(35,138)
	<u>193,549</u>	<u>52,497</u>

See accompanying summary of significant accounting policies and notes to financial statements.

Statement of Financial Position
as at December 31, 1977

Assets	1977	1976
	\$'000	\$'000
Fixed Assets		
Fixed assets in service, at cost	8,423,173	6,943,457
Less accumulated depreciation	1,607,067	1,404,982
	<u>6,816,106</u>	<u>5,538,475</u>
Fixed assets under construction, at cost	3,137,872	3,217,984
	<u>9,953,978</u>	<u>8,756,459</u>
 Current assets		
Cash and short-term investments (note 4)	447,973	375,963
Accounts receivable	256,035	203,079
Fuel for electric generation, at cost	357,502	295,300
Materials and supplies, at cost	99,271	83,526
	<u>1,160,781</u>	<u>957,868</u>
 Other assets		
Advance payments for fuel supplies (note 5)	95,077	37,908
Long-term investments (note 6)	68,623	68,672
Unamortized debt discount and expense	91,003	81,211
Long-term accounts receivable and other assets	16,173	21,557
	<u>270,876</u>	<u>209,348</u>
	<u><u>11,385,635</u></u>	<u><u>9,923,675</u></u>

See accompanying summary of significant accounting policies and notes to financial statements.

Liabilities

	1977	1976
	\$'000	\$'000

Long-term debt

Bonds and notes payable (note 7)	8,640,531	7 502,298
Other long-term debt (note 8)	268,232	276,400
	<u>8,908,763</u>	<u>7,778,698</u>
Less payable within one year	212,910	147,519
	<u>8,695,853</u>	<u>7,631,179</u>

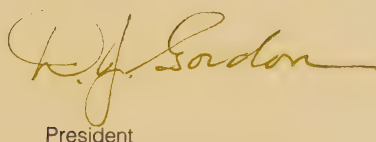
Current liabilities

Accounts payable and accrued charges	428,086	373,165
Short-term notes payable	44,935	128,740
Accrued interest	217,647	168,304
Long-term debt payable within one year	212,910	147,519
Excess revenues payable (note 1)	122,093	—
Estimated liability on cancellation of heavy water plant	7,348	11,479
	<u>1,033,019</u>	<u>829,207</u>

Equity

Equities accumulated through debt retirement appropriations ...	1,279,667	1,181,569
Reserve for stabilization of rates and contingencies	250,401	155,025
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	<u>1,656,763</u>	<u>1,463,289</u>
	<u>11,385,635</u>	<u>9,923,675</u>

On behalf of the Board


Chairman
PresidentToronto, Canada
March 13, 1978

**Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1977**

	Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
		Munici- palities	Direct Customers	Retail Customers	1977	1976
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	196,063	1,144	(6,537)	(35,645)	155,025	190,198
Appropriation (withdrawal)	92,151	95	(96)	3,321	95,471	(35,138)
Deficit recovered from municipalities on annexations	—	—	—	—	—	55
Payment to Ontario Municipal Electric Association (note 9)	—	(95)	—	—	(95)	(90)
Balances at end of year	<u>288,214</u>	<u>1,144</u>	<u>(6,633)</u>	<u>(32,324)</u>	<u>250,401</u>	<u>155,025</u>

**Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1977**

	Municipalities	Power District (Retail and Direct Customers)	Totals	
			1977	1976
	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	816,832	364,737	1,181,569	1,094,081
Add:				
Debt retirement appropriation	64,115	33,963	98,078	87,635
Annexation transfers and refunds	75	(55)	20	(147)
Balances at end of year	<u>881,022</u>	<u>398,645</u>	<u>1,279,667</u>	<u>1,181,569</u>

See accompanying summary of significant accounting policies and notes to financial statements.

**Statement of Changes in Financial Position
for the year ended December 31, 1977**

	<u>1977</u>	<u>1976</u>
	\$'000	\$'000
Source of funds		
Operations		
Income before extraordinary item	193,549	61,916
Depreciation, a charge not requiring funds in the current year	<u>215,601</u>	<u>180,213</u>
	409,150	242,129
Financing		
Long-term debt		
Bonds and notes issued	1,406,720	1,539,245
Less retirements	<u>276,655</u>	<u>252,188</u>
	1,130,065	1,287,057
Short-term notes payable — (decrease)	(83,805)	(51,400)
Cash and investments — (increase)	<u>(71,961)</u>	<u>(113,334)</u>
	974,299	1,122,323
Excess revenues (note 1)	122,093	—
Increase in accounts and interest payable including estimated liability on cancellation of heavy water plant	<u>100,133</u>	<u>42,402</u>
	<u>1,605,675</u>	<u>1,406,854</u>
Application of funds		
Net additions to fixed assets	1,413,120	1,309,378
Increase in advance payments for fuel supplies (note 10)	57,169	12,911
Increase in fuel, materials and supplies	77,947	12,288
Increase in accounts receivable and other assets (note 10)	57,439	62,858
Extraordinary item-loss on cancellation of heavy water plant (note 3)	<u>—</u>	<u>9,419</u>
	<u>1,605,675</u>	<u>1,406,854</u>

See accompanying summary of significant accounting policies
and notes to financial statements.

1. Anti-Inflation program

Effective October 14, 1975 the Government of Canada passed the Anti-Inflation Act (Canada). Subsequently, the Province of Ontario entered into an agreement with the Federal Government whereby Ontario Hydro is subject to the guidelines under this Act only in the matter of employee compensation. Management is of the opinion that Ontario Hydro is in compliance with the requirements of the anti-inflation legislation insofar as employee compensation is concerned.

Ontario Hydro is also required by the Province of Ontario to conform with the spirit and intent of the Federal Anti-Inflation program as it applies to net income. As a result of higher than anticipated secondary revenues and lower than anticipated costs in 1977, the Corporation had excess revenues of \$122 million. These excess revenues, together with interest, will be applied to reduce customers' bills over the 12 months of 1978.

2. Interest

	1977	1976
	\$'000	\$'000
Interest costs consisted of:		
Interest on bonds, notes and other debt	753,251	612,735
Less:		
Interest capitalized on fixed assets under construction	279,492	244,223
Interest charged to advance payments for fuel supplies	4,132	2,708
Interest earned on short-term and long-term investments	56,874	51,836
Net gain on redemption of bonds and sale of investments	5,201	1,187
Net exchange gain (loss) on redemption and translation of foreign assets and liabilities ..	3,724	(5,340)
	<u>349,423</u>	<u>294,614</u>
	<u>403,828</u>	<u>318,121</u>

3. Extraordinary item

During 1975, in response to the Ontario Government's concern about capital availability, Ontario Hydro reviewed and made revisions to its capital construction program. As a result, Bruce Heavy Water Plant "C", the cost of which had been estimated to be \$562 million, was cancelled. This cancellation resulted in extraordinary charges against income of \$60 million in 1975 and \$9.4 million in 1976 to write off the cost of preliminary construction and to provide for the costs of cancellation of contracts.

4. Cash and short-term investments

	1977	1976
	\$'000	\$'000
Cash and short-term investments, with short-term investments recorded at the lower of cost or market (approximately market value), consisted of:		
Cash (overdraft)	(10,187)	9,848
Notes of, and interest bearing deposits with, banks and trust companies	306,715	216,644
Corporate bonds and notes	82,930	96,472
Government and government-guaranteed bonds	68,515	52,999
	<u>447,973</u>	<u>375,963</u>

5. Advance payments for fuel supplies

	1977	1976
	\$'000	\$'000
The advance payments consisted of:		
Coal supply	58,589	37,908
Residual fuel oil supply	36,488	—
	<u>95,077</u>	<u>37,908</u>

Based on present commitments, additional advance payments for fuel supplies, including uranium supply, will total approximately \$362 million over the next five years (including approximately \$101 million in 1978).

6. Long-term investments

	1977	1976
	\$'000	\$'000
These investments are recorded at amortized cost and consisted of:		
Government and government-guaranteed bonds	<u>68,623</u>	<u>68,672</u>

Market value of these investments at December 31, 1977 was \$58 million.
(1976 — \$58 million)

7. Bonds and notes payable

Bonds and notes payable, expressed in Canadian dollars, are summarized by years of maturity and by the currency in which they are payable in the following table:

Years of maturity	1977			Weighted Average Coupon Rate	1976	
	Principal outstanding \$'000	Foreign	Total		Principal outstanding \$'000	Weighted Average Coupon Rate
	Canadian					
1977	—	—	—		139,424	
1978	140,530	63,601	204,131		228,701	
1979	141,300	10,459	151,759		156,402	
1980	78,050	178,735	256,785		290,785	
1981	208,267	94,430	302,697		330,048	
1982	271,434	183,746	455,180		—	
1 - 5 years	839,581	530,971	1,370,552	7.3%	1,145,360	6.7%
6 - 10 years	386,773	826,117	1,212,890	7.4	1,389,663	7.6
11 - 15 years	368,292	246,578	614,870	7.2	538,680	7.1
16 - 20 years	769,434	384,319	1,153,753	8.1	965,561	8.3
21 - 25 years	1,291,180	641,046	1,932,226	9.1	2,174,561	8.9
26 - 30 years	900,000	1,456,240	2,356,240	9.0	1,288,473	8.9
	<u>4,555,260</u>	<u>4,085,271</u>	<u>8,640,531</u>		<u>7,502,298</u>	

Currency in which payable

Canadian dollars	4,555,260	4,006,966
United States dollars	3,842,686	3,248,187
West German Deutsche marks	127,924	132,484
Swiss francs	<u>114,661</u>	<u>114,661</u>
	<u>8,640,531</u>	<u>7,502,298</u>

Bonds and notes payable in United States dollars include \$2,651 million (1976 — \$2,250 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario issues sold in the United States on behalf of Ontario Hydro. Except for these issues, all bonds and notes payable are guaranteed as to principal and interest by the Province of Ontario.

Long-term bonds and notes payable in foreign currencies are translated into Canadian currency at rates of exchange at time of issue. If Ontario Hydro were to translate the face value of its foreign bonds and notes payable at rates of exchange current on December 31, 1977, the total amount of these liabilities would have to be increased by \$440 million.

8. Other long-term debt

	1977	1976
	\$'000	\$'000
Other long-term debt consisted of:		
(a) The balance due to Atomic Energy of Canada Limited for the purchase of Bruce Heavy Water Plant "A". Under the purchase agreement, Ontario Hydro pays equal monthly instalments of blended principal and interest to December 28, 1992, with interest at the rate of 7.795%	224,486	232,176
(b) Capitalized lease obligation for the head office building at 700 University Avenue, Toronto. The lease obligation is for the 30-year period ending September 30, 2005, payable in United States dollars at an effective interest rate of 8%	<u>43,746</u>	<u>44,224</u>
	<u>268,232</u>	<u>276,400</u>

Payments required on the above debt, exclusive of interest, will total \$51 million over the next five years. The amount payable within one year is \$8.8 million (1976 — \$8.1 million).

9. Payment to Ontario Municipal Electric Association

The amount of this payment is equivalent to interest on the balance held for the benefit of Municipalities in the Reserve for Stabilization of Rates and Contingencies.

10. Reclassification of 1976 amounts

(a) In prior years, the value attributed to energy produced during the commissioning period was included in the cost of fuel used for electric generation. To be consistent with the 1977 presentation, 1976 amounts have been reclassified in the Statement of Operations.

(b) Changes have been made in the classification of items in the Statement of Changes in Financial Position. The presentation of the comparative 1976 items has been changed to conform with the 1977 presentation.

11. Subsequent event

In February 1978 the Board of Directors, following receipt of a revised load forecast projecting a substantially lower rate of growth than previously forecast for the period up to 1987, initiated a review of the current construction program. This review will not affect the 1977 financial statements. The financial effects, if any, upon 1978 and subsequent years cannot be determined at this time.

Progress on power developments

Nanticoke: Despite serious technical problems during 1977, Nanticoke's net peak output of 2,910 megawatts on November 25 is the largest amount of power ever produced at a single thermal generating station in Canada. Technical problems were first encountered at Nanticoke in late 1976 when defective boiler hanger rods were discovered. The installation of new hanger rods began in July 1977, and all eight units were completed by November. Concurrent with this problem, cracks were discovered in the generator rotors of units of similar design in the United Kingdom. Checks were made of the Nanticoke rotors

and small cracks were found. Interim corrective action was taken while investigation into the cause continued. The investigation is now complete and modifications designed to eliminate the problem will be carried out in 1978 and 1979.

Lennox: The fourth and last unit of the 2,295,000 kilowatt oil-fired station was declared in service in early January, 1977.

Bruce: On September 1, the first two units of the 3,200,000 kilowatt Bruce A nuclear station were declared in service. The third unit was added in February, 1978, and the last unit should be in service by early 1979. Work on the Bruce B

station is well underway, with the first unit expected to be in service by 1983. Work is nearing completion on Bruce Heavy Water Plant B. Although parts of the plant are now in service, the total plant will not be in full operation until early 1980. Bruce Heavy Water Plant D is under construction and 25 per cent complete at year's end.

Arnprior: The second and last unit at the 74,100 kilowatt hydro-electric station was declared in service in March, 1977.

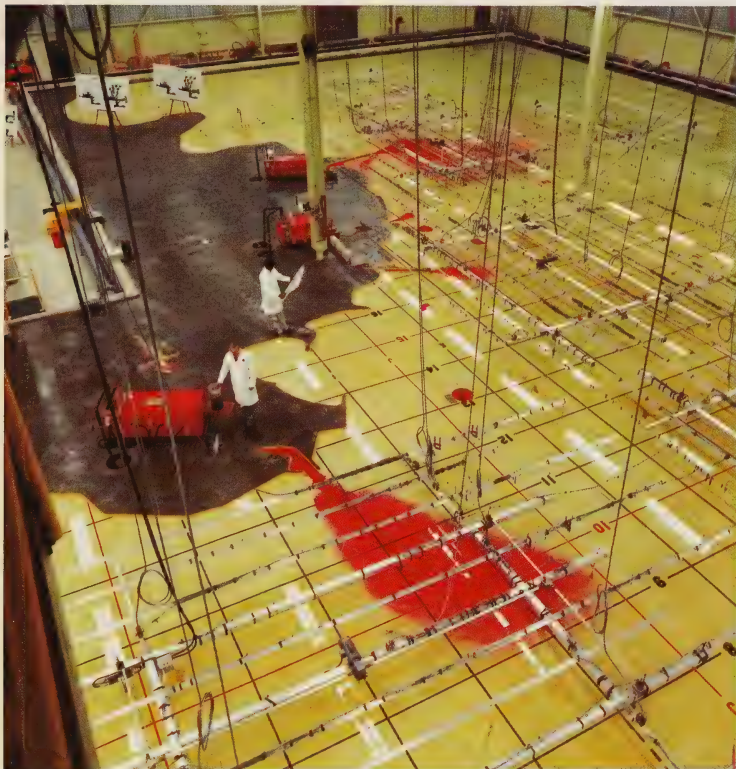
Thunder Bay: Lack of precipitation in northwestern Ontario prevailed throughout the first half of 1977, causing a shortage of hydraulic generation. Consequently, the coal-fired, 100,000 kilowatt unit at Thunder Bay achieved an unprecedented capacity factor of 90 per cent during the January-May period. Meanwhile, work continued on the 300,000 kilowatt extension to the Thunder Bay station. The two lignite-fired units are expected to be in service by 1981.

Pickering: Construction is well advanced on the four-unit Pickering B nuclear station. The first of the 540,000 kilowatt units is expected to be in operation in 1981.

Darlington: Site work was started in 1977 on the 3,400,000 kilowatt Darlington nuclear power station on Lake Ontario between Bowmanville and Oshawa. The four-unit station should be fully operational by 1988.

Wesleyville: Following a one year postponement, work resumed on the 2,295,000 kilowatt Wesleyville station. The first of four oil-fired units should be in service near the end of 1981.

J. Clark Keith: Modernization of the four-unit J. Clark Keith generating station continued in 1977. The 264,000 kilowatt coal-fired station will be outfitted with improved electrostatic precipitators and a single stack. These measures will help the station meet the air quality requirements.



Hydro's continued concern with the protection of the environment is evident in the new A. W. Manby hydraulic test laboratory, simulating the cooling water intake and thermal discharge plume of the Bruce nuclear power development. From the model, scientists and engineers can study the impact generating stations have on Ontario's rivers and lakes.

The transmission system

The design, construction and acquisition of property for the 500 kV transmission line corridor from Middleport transformer station to connect to new transformer stations near Milton, Trafalgar and Claireville continued in 1977. The 500 kV line from Milton to Trafalgar was completed and significant progress was made in the construction of the other line sections.

Considerable opposition is still being encountered to the route of the 500 kV line from Bruce generating station to Milton transformer station. Construction commenced on portions of the line between Bruce generating station and Colbeck where property rights could be obtained. The completion date for the line is indefinite pending the outcome of hearings before the Ontario Municipal Board and the Niagara Escarpment Commission.

Since the third unit of the Bruce A nuclear station began producing power in December of 1977, there have been times when energy is locked in due to the lack of a 500 kV line. This loss of energy will cost an estimated \$12 million during 1978 as Hydro turns to more

expensive, fossil-fuelled plants in the system to replace the locked-in power.

Expropriation hearings were held on the 500 kV line from Lennox generating station to Oshawa and the Minister approved the expropriation in February, 1978. In addition a number of 230 kV and 115 kV transmission lines were completed during the year involving the construction of approximately 320 kilometers (200 miles) of line.



Old-time corduroy road saves Beverley Swamp during 500 kV line construction.

Once called a "cherry picker," this 75-foot insulated aerial lift allows linemen to work on energized 500 kilovolt lines.



Hydraulic plants upgraded

While construction and expansion of thermal plants continues apace, Ontario Hydro is also active in the upgrading of some of the older hydraulic plants and is studying the technical, economic and environmental possibilities of the northerly flowing rivers.

At the Chats Falls, Abitibi Canyon and Des Joachims hydraulic plants, Hydro is installing modern and more efficient generating equipment. It has also launched a five year study program re-examining the economic feasibility of previously identified

power sites, plant extensions and re-development schemes.

Ontario Hydro is also pursuing the development of small, air-transportable turbine generators for northern and isolated settlements. These generators, rated at 150 kilowatts, use siphon penstocks or small dams across only a portion of the river. Pilot projects are currently under way, including one at Deer Lake.

Hydro purchases 86% Canadian

Compared with the \$1 billion value of awards in 1976, the 1977 total value stood at \$1.4 billion, excluding the value of primary fuel. The \$400 million rise over 1976 can

be attributed to increased buying activity associated with a growth in Ontario Hydro's construction program which moderated during 1976.

During 1977, outstanding commitments increased from \$1.77 billion in 1976 to \$1.95 billion.

Excluding primary fuel, 86 per cent of the total value of 1977 purchases were directed to Canadian sources, and 88 per cent of this business was placed in Ontario. Ontario Hydro is therefore continuing in its efforts to award business to, and stimulate the development of, Canadian suppliers wherever possible.

In general, availability of materials continued to be excellent in 1977 with a highly competitive environment in evidence, one which should persist for the next few years.

Staff relations, health and safety

Ontario Hydro's relations with its 25,000 employees remained generally good throughout 1977, and its record in the health and safety sector is high in comparison with other utilities and industries in Canada.

Wage and salary settlements were below the limits established under Anti-Inflation Board guidelines. These agreements were aided by the Corporation's regular discussions with the two bargaining agencies representing the vast majority of regular staff.

Health and safety performance

continues at a high level, specifically in the nuclear program, and especially in the occupational radiation protective sector. From 1959 there have been no fatalities from any cause and there has not been a single lost-time day due to exposure to ionizing radiation. This period represents 35 million manhours.

A long range health study being carried out by Dr. T. Anderson of the University of Toronto shows that all major categories of employees in Ontario Hydro are healthier than the average person in the Ontario population, with no indication of any

statistically significant increased incidence of cancer or other occupational related disease among any segment of the work force.

Public, government in Hydro planning

The expansion of the provincial electrical system in the past year has witnessed a major effort by Ontario Hydro to involve potentially affected publics and governments in the planning process.

To ensure public debate and input in the matter of line and site locations, teams involving several disciplines within Hydro worked

directly with citizens and elected officials. As an example, a total of 82 meetings were held in 1977 to examine and evaluate 24 projects falling under the new requirements and exemption clauses of the Environmental Assessment Act. In Eastern Ontario, this process identified four possible generating sites out of a possible 23. In each

case the Hydro/citizens' groups examined the study area, the need for the facility and the alternatives available, as well as the environmental and socio-economic factors involved. At year's end, 28 additional projects were under active public participation planning.



Since energy saving begins in the home, Hydro conservationists move into the kitchen to evaluate the energy efficiency of pots, pans and electric ranges. Their studies show that cooking costs can be reduced, with no loss of quality, using energy-efficient appliances and methods.

Why Electricity Costs More

Ontario Hydro
700 University Avenue
Toronto, Ontario

Dear Sir:

I am a life-long resident of Ontario and have always had great admiration for Hydro and the cheap electricity it provided.

Things seem to have come unstuck in an awful hurry. I understand about the market manipulation of the OPEC oil-producing countries and why the price of gasoline, oil, and natural gas is going up — even though I don't like it.

But, why has Hydro jumped on this charge-what-the-market-will-bear bandwagon? We used to have cheap power in this province and I thought Hydro was supposed to produce electricity at what it cost and not make any profit, regardless of what prices of other energy companies might be.

What's going on down there in Toronto?

A concerned Hydro customer

The cost of electricity has risen substantially in recent years, prompting an increasing number of letters like the one above. The simple reason why Hydro bills are rising is that it costs more to manufacture electricity than it used to.

Yes, electricity is a manufactured product, although many people seem to regard it as a service or as a natural resource of this province. As for other manufactured products, although with the profit factor removed, the final cost of electricity to the customer in Ontario is dictated by the prices of the ingredients in the recipe for electric energy — the primary fuel sources necessary to operate generating stations; the steel, aluminum, electrical equipment, property, wages, and salaries that are all required to operate and develop the provincial power system to meet customer demands.

Fuel costs

The chart opposite shows that the cost of the fuel needed to produce electricity took the largest part of the customer's dollar in 1977 — 22 cents. Rising costs of fuel are a primary reason for the higher price of electricity in Ontario as the contribution of water power to the total has diminished. In 1973, coal had to be imported by Ontario Hydro from mines in the United States at a cost of \$13 per ton (\$14 per megagram). In four short years that price ballooned to \$35 per ton (\$38 per megagram).

Fossil fuels not only cost more, they also contribute an increasing share to electric production, and the major factor in the rise of electric bills is the shift in the source of electric power from falling water to expensive fuel sources. As late as 1960, 99.5 per cent of the power generated by Ontario Hydro came from hydro-electric stations utilizing most of the fast-flowing and accessible Ontario rivers. By 1977, hydro-electric generation constituted only about 37 per cent of total energy generated while thermal generation — coal, oil, natural gas, uranium — supplied the rest. So, in

a decade and a half, Ontario has moved from a position of enjoying electricity produced from a virtually free, almost inflation-proof primary energy source — water power — to a reliance on fuels that are expensive and subject to inflationary pressures.

Interest charges

Twenty-one cents of each customer dollar in 1977 went to meet interest charges on the money Hydro has borrowed to pay for new power facilities. As demands for electricity grow, Ontario Hydro has had to expand its power system to meet these needs. New generating plants and transmission lines must be built. Major borrowings are required to help finance the costs of these expensive undertakings. Because of larger borrowings and higher interest rates, this cost has gone up by 110 per cent over the past five years.

Operating costs

Another 21 cents of each customer dollar was applied to the cost of operating, maintaining, and administering the provincial power system. The cost of OM&A has risen by an annual average of 14.3 per cent over the past five years. The two primary components are labor and materials. Since 1973 the annual escalation in labour costs has ranged from a high of 17.3 per cent in 1974 to a low of 9.3 per cent in 1977. The annual average increase in the number of people employed by Hydro over the same five year term was 2.3 per cent. Inflation has caused substantial increases in equipment and material costs in the same period.

Depreciation a factor

Eleven cents of each dollar represented the depreciation of power system facilities. That is the annual charge established to recover the original cost of capital facilities over their estimated useful service lives. The effect of inflation on the cost of building new facilities has also contributed to increased charges in this sector.

Appropriations to reserves

Ten cents of each dollar was applied to the retirement of debt (a statutory requirement) and to the reserve for the stabilization of rates and contingencies. It is vital that Ontario Hydro maintain its financial integrity. If the Corporation is to continue to be able to borrow the money it requires at reasonable interest rates it must demonstrate that it is financially sound. Much the same rules apply to each of us and to our personal finances. If you want to borrow money to purchase a new car, the one thing the lender wants to know is how much debt you already have. If he discovers that you owe other people for almost every asset you possess, he could refuse the loan or charge a much higher interest rate on the loan. Such is the risk run by Ontario Hydro if its debt is allowed to get too high. Hydro must avoid an over-reliance on borrowed capital and make sure that sufficient revenues are obtained from customers to keep its credit rating secure.

Purchased power

A further seven cents of each dollar goes for power purchased at economical prices from other utilities. This seven cents also includes charges equivalent to the operating and fuel costs incurred in producing the same quantity of energy at generating units displaced

in the process of commissioning new units.

Nuclear payback

When Ontario Hydro built Pickering A, Canada's first full scale, commercial nuclear station, the governments of Canada and Ontario shared the risk of this new technology by contributing to the capital cost. Two cents of each dollar was applied to a portion of these loans in 1977.

Customer rebate

Six cents of each dollar of revenue in 1977 is being returned to Hydro customers in the form of an anti-inflation rebate applied to their bills in 1978.

In July of 1977, Hydro informed the Ontario Energy Board that it was forecasting excess revenue of \$108 million for 1977 because of several unexpected factors. The OEB reviews in public hearings each rate increase proposed by Hydro. Although Hydro is technically exempt from the federal anti-inflation guide lines, Hydro and the provincial government decided when the program was introduced that any application for rate increases before the Ontario Energy Board would conform to the spirit and intent of the program.

The factors which produced the extra revenue — finally determined to be \$122 million — included profits from sales of power to the

United States, the reduction in the projected cost of operation, maintenance, and administration already mentioned, and the continued outstanding performance of the Pickering A nuclear station.

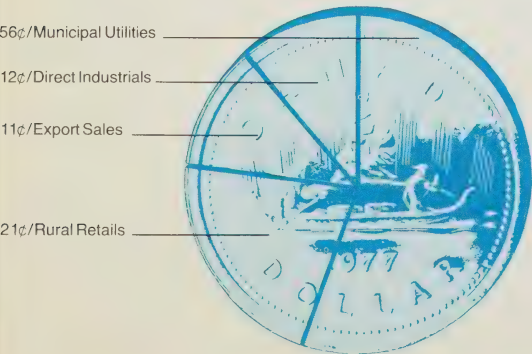
The total unit cost of electricity produced from Pickering's nuclear reactors is about one half of that from a comparable coal-burning station. Nuclear energy contributed more than a quarter of Hydro's total production for the first time in 1977.

The future

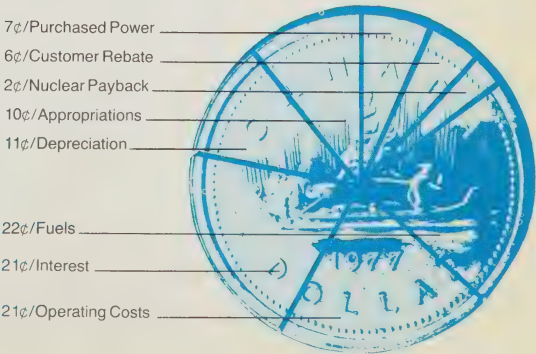
Although there will be further increases in the real price of electricity in the near term, that is, after the effects of inflation are allowed for, the transition from a low-cost hydro-electric system to a higher-cost thermal one is nearly at its end.

For the future, nuclear energy offers the promise of much greater stability in that element of the cost of electricity that in 1977 took the largest part of the customer's dollar — fuel. Although the raw materials and equipment that go into a nuclear station are subject to pressures of inflation, once the plant is finished it becomes about as inflation-proof as one can get because the cost of its fuel — uranium — represents such a small amount of the cost of the energy produced compared with a plant using coal, oil, or natural gas.

Where each Hydro dollar came from:



Where each Hydro dollar went:



Western Canadian coal for Ontario Hydro

One of the largest bulk transportation systems ever launched in Canada, involving millions of tons of western Canadian coal for Ontario Hydro boilers, will commence operation late in 1978.

The program, with capital expenditures of \$422 million, will have a dramatic effect on Canada's bulk transportation capabilities and beneficial implications for its national balance of payments.

Designed to lessen Ontario's dependence on foreign coal sources, the project will provide a direct stimulus to the Canadian economy as a whole and will create jobs and a considerable cash flow into the economies of Ontario, British Columbia, Alberta and Saskatchewan over the next 15 years.

Initiated by Ontario Hydro, the supply system involves five key elements: supply from the mines; rail transportation to Thunder Bay; terminalling at Thunder Bay; lake vessel shipment to Nanticoke generating station; and the blending with U.S. coal prior to use at Nanticoke.

Nearly 3,400,000 megagrams (3.7 million tons) of fuel per year will be mined and moved east at the outset: 2,500,000 Mg (2.7 million tons) per year of bituminous coal from sources in Alberta and British Columbia and approximately 910,000 Mg (1 million tons) per year of lignite from Saskatchewan for use in the Thunder Bay generation station.

To move this mountain of fuel to the Thunder Bay transshipment terminal will require a total of 36 diesel locomotives, 800 gondola cars with a capacity of more than 90 Mg (100 tons) each, eight cabooses and one robot (control) car. The total value of this equipment, which will be built largely in Ontario, will exceed \$50 million, and delivery is scheduled for 1978. Ontario Hydro is responsible for providing this equipment and is expected to do so through leasing arrangements with the railroads involved.



Above: This CNR coal train outside Luscar, Alberta is bound for Thunder Bay.

Below: CP Rail locomotives being built at the General Motors plant in London.



All of this equipment will roll night and day along the 2,250-kilometre (1,400-mile) route from Alberta and British Columbia to Thunder Bay, and down the 1,200-km (750-mile) line from the Saskatchewan lignite fields. Turn-around times will be six and seven days for the mines in British Columbia and Alberta respectively and three to four days for the Saskatchewan source.

Loads will be approximately 9,000 Mg (10,000 tons) per trip, or about 486,000 Mg (500,000 tons) per year, for each bituminous coal train and 910,000 Mg (1 million tons) per year for the lignite train.

To achieve these load factors, both Canadian National Railways and CP Rail are completing major work to upgrade the tracks, lengthen sidings and make other improvements to speed the new traffic.

At Thunder Bay the new terminal being constructed on McKellar Island will have an initial capacity of 2,722,000 Mg (3 million tons) of throughput per year with provision to expand to 5,440,000 Mg (6 million tons) per year. The facilities are designed to unload a 100-car train in six hours, and to load a conventional 222-metre (730-foot), 27,000 Mg (30,000 ton) capacity ship in about eight hours. Lignite will also be unloaded at the terminal, but will be transferred to the generating station on nearby Mission Island by a belt conveyor to be routed under the McKellar River.

The new system has also sparked the laying of hulls for new lake carriers at Collingwood and Port Weller, designed to be capable of floating at least 910,000 Mg (1 million tons) of coal per year.

Meanwhile, a \$26 million blending facility is under construction at Nanticoke. Western Canadian coal can not be burned alone in Hydro's boilers, which were designed for the high heat content of U.S. coal, so extensive tests were carried out to determine the best way to use the western Canadian product.

The Canadian coal has a low sulphur content and thus emits less sulphur dioxide when burned, but on its own does not support efficient operation of existing fly-ash precipitators.

The plan is to use a 50-50



Massive shovel carves the coal from an open-pit mine in the Alberta foothills.

mixture, with two types of coal being fed into separate 1,675-Mg (1,850-ton) silos after which they will be automatically mixed at rates up to 5,400 Mg (6,000 tons) per hour.

Preliminary estimates of the capital investment involved in the new system are in excess of \$422 million. Ontario Hydro's share is approximately \$79 million, or 18.7 per cent, and covers the manufacture of the railroad equipment and the Nanticoke blending terminal. Other costs being contributed by the companies involved are \$133 million in mine development, \$60 million for the Thunder Bay terminal, \$90 million toward improvement of railroad facilities and approximately \$60 million in ship building.



A worker at the minehead is captivated by the awesome beauty of the Rockies.

Despite the western Canadian coal purchases, Ontario Hydro will continue to import the bulk of its requirements from the Appalachian region of the U.S., for even with the expanding nuclear program, coal-fired generation will account for one-third of Ontario's electrical resources by 1980. It is estimated that up to 13,600,000 Mg (15 million tons) of coal will be required by the mid-1980s, up more than 50 per cent from 1977.

While there is no anticipation that existing U.S. coal sources are insecure, it seemed prudent — with U.S. leaders looking more and more toward coal as a solution to their energy problems — for Ontario Hydro to seek a measure of domestic supply.

Based on 1976 estimates, western Canadian bituminous coal will cost an average of 40 to 50 per cent more than that from existing U.S. sources, primarily because of transportation and handling costs.

However, once the new supply system is established, the capital intensive nature of the project should make operating costs less sensitive to inflationary pressures.

And there seems little doubt that the improved bulk rail and water transport system, ushered in by Ontario Hydro's fuel requirement, will improve the west-east flow of bulk commodities and may spark an interest by other eastern industries in western coal as a fuel source.

Comparative Statistics

	1977	1976	1975	1972	1967
Dependable peak capacity ('000 kW)	21,347	19,677	18,667	14,422	8,995
December primary peak demand ('000 kW) ..	15,677	15,896	14,513	12,739	8,964
Primary energy made available ('000,000 kW.h)	92,855	90,853	84,222	73,497	51,357
Primary energy sales ('000,000) kW.h)					
Municipalities	58,300*	57,635	54,523	45,950	30,534
Retail	13,800*	12,436	11,049	9,069	5,891
Direct	15,200*	14,071	12,588	13,539	11,136
Total	87,300*	84,142	78,160	68,558	47,561
Secondary energy sales ('000,000 kW.h)	8,500*	4,157	4,918	6,478	3,164
Number of ultimate customers ('000)					
Residential	2,350*	2,297	2,239	2,091	1,904
Farm	118*	121	123	125	132
General	302*	292	285	264	209
Total	2,770*	2,710	2,647	2,480	2,246
Average annual kW.h per customer					
Residential	10,000*	9,708	9,203	8,363	6,781
Farm	17,500*	16,955	15,914	13,577	10,158
General	207,500*	198,722	188,583	182,446	155,138
Average revenue per kW.h (¢)					
Residential	2.80*	2.23	1.94	1.53	1.24
Farm	2.95*	2.46	2.24	1.78	1.67
General	2.10*	1.63	1.39	1.04	0.86
Transmission lines					
miles	24,684	24,211	23,741	22,325	19,492
kilometres	39,724	38,964	38,207	35,929	31,369
Retail distribution lines					
miles	56,671	56,150	55,567	53,322	50,316
kilometres	91,184	90,365	89,426	85,813	80,976
Long-term bonds and notes issued (\$'000,000)	1,407	1,539	1,601	557	340
Gross expenditures on fixed assets (\$'000,000)	1,425	1,326	1,442	562	252
Revenues (\$'000,000)					
Primary power and energy	1,637**	1,320	1,027	665	367
Secondary power and energy	210	90	43	37	3
Assets (\$'000,000)	11,386	9,924	8,593	5,525	3,443
Staff, average for year	25,118	24,123	25,361	22,582	16,651

* Preliminary

**after deducting excess revenue of \$122 million

Ontario Hydro wins four design awards

Ontario Hydro won awards for all four of its entries in the American Public Power Association's biennial awards program for utility design during 1977.

The prestigious APPA honor awards, which were originated to "stimulate aesthetic consideration by local publicly-owned electric utilities," were granted to the Lennox and Arnprior generating stations and the Lorne Park substation.

The awards jury determined that the fourth entry, Ontario Hydro's headquarters building — Hydro Place — exceeded the scope of the electric utility building category since the structure also contains commercial facilities. The jury, however, decided the entry should receive a Special Award for "its architectural excellence and benefit to the community."



Lennox generating station

The Corporation story

Ontario Hydro is a special statutory corporation that was established by the Provincial Legislature in 1906 and now administers an electric power enterprise having broad powers to produce, buy, and deliver electric power throughout the Province of Ontario. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c. 354 as revised.

The Corporation is administered by a Board of Directors that consists of a chairman, a vice-chairman, a president, and not more than ten other directors. The Corporate Office, composed of the president and three vice-presidents, concentrates on overall corporate objectives and policies with day-to-day operations being the responsibility of seven general managers each of whom reports to a vice-president.

The prime concern of the Corporation is the provision of electric

power to municipalities for resale to the people of the Province. Ontario Hydro also provides power to certain direct industrial customers such as pulp and paper mills and mining operations and to retail customers either in rural areas or in communities not served by municipal electric utilities. In addition to supplying power, Ontario Hydro exercises certain regulatory functions with respect to the electrical service provided by municipalities and maintains seven regional offices and 61 area offices suitably located throughout the Province.

The Power Corporation Act by which Hydro is governed stipulates that service be provided at cost. The Act defines cost as including charges for power purchases, operation, maintenance, administration, fixed charges and reserve adjustments. Fixed charges include interest, depreciation and the

provisions for the retirement of debt over a 40-year period.

The Province of Ontario guarantees the payment of principal and interest on all bonds and notes issued to the public by Ontario Hydro. In the case of public borrowing in the United States, the Province borrows on behalf of Hydro by issuing its own debentures and advancing the proceeds to Ontario Hydro upon terms and conditions agreed upon between the Corporation and the Treasurer of Ontario.

Pension and Insurance Fund Statement of Assets as at December 31, 1977

	1977	1976
	\$'000	\$'000
Fixed income securities		
Government and government-guaranteed bonds	130,468	110,045
Corporate bonds	119,565	111,739
First mortgages	248,460	228,510
Total fixed income securities	498,493	450,294
Equities — corporate shares	271,466	227,934
Cash and short-term investments	27,578	4,356
Total investments	797,537	682,584
Accrued interest and dividends	10,488	7,830
Receivable from Ontario Hydro	11,499	2,450
	<u>819,524</u>	<u>692,864</u>

Notes

1. The most recent actuarial valuation of the pension plan, at December 31, 1976, reported an unfunded obligation of Ontario Hydro of approximately \$143 million. Of this amount, \$105 million, representing an experience deficiency and deficits resulting from changes in actuarial assumptions, is being amortized over the years 1977 through 1981. The balance of \$38 million, representing an unfunded liability with respect

to improved benefits, is being amortized over the years 1977 through 1991.

2. In the above statement of assets, bonds are included at amortized cost, first mortgages at balance of principal outstanding and shares at cost. Total bonds and shares at December 31, 1977 with a book value of \$521 million had a market value of \$510 million (1976 book value \$450 million — market value \$438 million).

Auditors' Report

(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1977. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1977.

Toronto, Canada
March 13, 1978

CLARKSON, GORDON & CO.
Chartered Accountants



Ontario Hydro Regional Managers



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Northeastern Region
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E.G. Bambridge
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EP
- A55'

JOINT FORCES
CONSERVED OUR
RESOURCES
WHO EFF
NEEDED
RIGHTS



1978
Ontario Hydro Annual Report



Ontario Hydro

Head Office,
700 University Avenue, Toronto M5G 1X6

Board of Directors

- Arthur J. Bowker**, Ottawa
Research Officer
National Research Council
- †† **William Dodge**, O.C., Ottawa
Former Secretary-Treasurer
Canadian Labour Congress
- †* **Douglas J. Gordon**, Toronto
President, Ontario Hydro
- † **Robert H. Hay**, Kingston
Member, Kingston Public Utilities Commission
- * **Allen T. Lambert**, O.C., Toronto
Director
The Toronto-Dominion Bank
- J. Conrad Lavigne**, Timmins
President, Mid Canada Television System
- * **Philip B. Lind**, Toronto
Vice-President and Secretary
Rogers Cable Communications Ltd.
- † **Sister Mary**, Toronto
Executive Director,
St. Michael's Hospital
- * **J. Dean Muncaster**, Toronto
President and Chief Executive Officer
Canadian Tire Corporation Limited
- † **Robert M. Schmon**, St. Catharines
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The Ontario Paper Company Limited
- William A. Stewart**, Denfield
Former Ontario Minister of Agriculture and Food
- †** **Robert B. Taylor**, F.C.A., Toronto
Chairman, Ontario Hydro
- * **Robert J. Uffen**, F.R.S.C., Kingston
Vice-Chairman, Ontario Hydro
Dean, Faculty of Applied Science
Queen's University
- †† Chairman of the Audit Committee
† Member of the Audit Committee
** Chairman of the Finance Committee
* Member of the Finance Committee

On December 31, 1978, Mr. Schmon retired from the Board. He was replaced by Hugh L. Macaulay of Toronto, who was named Chairman Designate (effective July 1, 1979). On January 15, 1979, Mr. Macaulay was elected Vice-Chairman by the Board.

Officers

- Chairman of the Board**
Robert B. Taylor, F.C.A.
- Vice-Chairman**
Robert J. Uffen, F.R.S.C.
- President**
Douglas J. Gordon
- Executive Vice-Presidents**
Patrick G. Campbell
Executive Vice-President Operations
Milan Nastich
Executive Vice-President Planning & Administration
- Vice-Presidents**
George R. Currie
Vice-President Distribution & Marketing
Frank W. Gomer
Vice-President Resources
H.A. Jackson
Vice-President Design & Construction
Harold E. Kennedy
Vice-President Supply & Services
Lorne G. McConnell
Vice-President Production & Transmission
Arvo Niitenberg
Vice-President Power System Program
Henry J. Sissons, M.B.E.
Vice-President Corporate Relations
Harold A. Smith, M.B.E., F.R.S.C.
Vice-President Special Assignments
- Secretary and General Counsel**
William E. Raney, Q.C.



At its meeting of January 15, 1979, the Board of Directors established two new standing committees: Management Resources, with Dean Muncaster as Chairman; and Social Responsibility, with Hugh Macaulay as Chairman. The roles of these committees are set out in the Report of the Board.

Report of the Board of Directors Of Ontario Hydro for the year 1978

TO THE HONORABLE JAMES AULD, MINISTER OF ENERGY

The year 1978 was a milestone in the history of electric power production in Ontario. For the first time, nuclear-electric generators surpassed coal-fired units as a source of electricity for the people of the province — contributing approximately 30 per cent of the total compared with 28 per cent for coal.

While all but 20 per cent of Ontario's total energy needs were imported last year, a little more than 68 per cent of the province's electricity came from its own resources — water power and uranium.

Primary energy demand in 1978 was up by 2.7 per cent compared with the increase of 2.2 per cent in the previous year. Export sales of interruptible power, mainly to utilities in New York and Michigan, were up by a substantial 39 per cent — partially due to interruptions of coal deliveries — and yielded a net benefit of almost \$120 million to Ontario power users.

The continuing prospect of slack economic conditions indicated that the new annual forecast of growth in customer demand, scheduled to be received by the Board in February, 1979, would again be below the projection made in February, 1978. In December, the Board instructed management to place a hold on all new commitments for generating facilities until the generation expansion program had been fully reviewed. In addition, it directed that cash expenditures on projects at Wesleyville, Atikokan, Bruce and Darlington be minimized until further decisions were made.

Furthermore, it was decided to stop construction and store equipment on the second half of the third heavy water plant at Bruce, and review the status of the first half again in the spring. Earlier, the Board had supported the position of the Ontario Minister of

Energy in urging an integrated federal-provincial program for the production and marketing of heavy water.

Although this report deals with the year 1978, some significant decisions made in the first four months of 1979 should be recorded here. At its meeting in February, 1979, the Board reviewed and accepted the new forecast, which, as expected, was significantly lower than that of February, 1978, as the planning document for the corporation's generation and transmission program. The forecast showed concrete evidence of the successful efforts of Hydro customers to conserve energy. The new forecast predicted an average growth of 4.7 per cent a year in customer demand to 1990, and 4.2 per cent from 1990 to the year 2000. In 1978, the forecast growth rate had been 5.5 per cent to 1987, gradually reducing to 4.5 per cent by the turn of the century. This downward trend indicated a reserve position in the years ahead that could be from 15 to 25 per cent higher than is considered appropriate for the Ontario power system.

So, in February, 1979, as the first step in attempting to balance the effects of weakening electrical demands with the committed expansion program, the Board decided that the construction of the remaining two oil-fired generating units at Wesleyville should be stopped and the equipment stored until needed, probably about 1990. This decision was based in part on information that had been presented to the Board in 1978 when alternatives were examined to reduce the then existing program.

With the prospective reserve position in mind and after a careful review of the generation program in April, 1979, the Board decided to continue construction of the Atikokan, Bruce B, and Dar-

lington generation stations but on an extended schedule. The operational dates for the individual units at the three stations will be stretched out so as gradually to bring capacity into line with projected demand. The Board concluded that the extended schedule was the best way to achieve its objective and would cause as little disruption to industry and employment as possible under the circumstances.

Compared with generation, the problem with respect to transmission lines is quite different. The Board is concerned about the costs — both in terms of economics and reliability of service — of the continuing delays being experienced in meeting service dates for new lines. One of the most urgently required lines is to move power from the now completed Bruce nuclear station into the provincial power grid. Legal action by local opposition groups again delayed construction of the last 28-mile section still to be completed. The cost penalty of this locked-in power is estimated at \$1 million to \$3 million a month. This line is now almost three years behind schedule.

The past months have seen a number of significant events. The federal and Ontario governments reached agreement committing both governments and their agencies, Atomic Energy of Canada Limited and Ontario Hydro, to develop and demonstrate the safe disposal of irradiated uranium fuel from nuclear power stations. The Select Committee of the Legislature on Hydro Affairs completed its review of the costs of the Bruce heavy water plants being built for Hydro by Lummus Canada Limited and found no evidence of mismanagement. Although it suggested that remedial action should have been taken sooner, it concluded that Hydro had demonstrated its capability to manage



projects of this magnitude.

In September, after public hearings on Hydro's 1979 rate proposal, the Ontario Energy Board informed the Minister of Energy that it accepted Hydro's forecast of revenue and its rate proposal. In September, after reviewing the OEB's report, the Hydro Board announced it would implement its rate proposals for the wholesale cost of power by an increase of 9.8 per cent to the municipal utilities and 10.1 per cent to approximately 100 large industrial customers, effective January 1, 1979. Revenue in 1978 exceeded the amount allowed within the spirit and intent of the Anti-Inflation program guidelines by \$130 million. This money, with interest, is being applied to reduce customers' bills in 1979.

Total "excess revenue" rebated to customers in 1978 and 1979 will amount to \$252 million. The effect of these refunds has been to limit the average net increase in wholesale power rates over the two years 1978-79 to 5.9 per cent a year. Without the benefit of these

rebates, the increases would have averaged 9.6 per cent.

Also in September, Dr. Arthur Porter and his colleagues on the Royal Commission on Electric Power Planning issued their interim report on nuclear energy entitled *A RACE AGAINST TIME*. The report recognized the need and safety of the CANDU nuclear system and also identified the uncertainties inherent in making forecasts of electric power consumption. It also said that growth scenarios of electric energy to the year 2000 of between two per cent and six per cent were credible, and offered four per cent as an interim conclusion.

One of the most significant public hearings in terms of its long run implications is the review by the Ontario Energy Board of Hydro's Costing and Pricing Study. It is expected to report its findings in 1979. The objective of the study and its review by the OEB is to find the most equitable method of pricing electricity in Ontario.

Within Hydro, three ad hoc

advisory committees to the Chairman, composed of members of the Hydro Board, examined three key areas of concern during 1978: organization, public accountability, and government relations.

As a result of the recommendations of the Committee on Organization, the Board of Directors in October approved a fundamental realignment of responsibilities at the senior level of the organization, details of which appear elsewhere in this report. The objective is to achieve more integrated strategic planning, improve monitoring and control capability at the corporate level, obtain a more definitive assignment of operational and corporate responsibilities, and place greater emphasis on accountability. In January, 1979, this committee was made a standing committee of the Board. Its name was changed to Management Resources and Mr. Dean Muncaster was elected Chairman.

The ad hoc committee on public accountability, chaired by Mr. Philip Lind, was also established as a standing committee, under the



Ontario Hydro Board of Directors. Seated (left to right): Sister Mary, Toronto; Robert J. Uffen, Vice-Chairman, Kingston; Robert B. Taylor, Chairman, Toronto; Douglas J. Gordon, President, Toronto; J. Dean Muncaster, Toronto; Standing, (left to right): Arthur J. Bowker, Ottawa; William A. Stewart, Denfield; William E. Raney, Secretary and General Counsel, Toronto; Philip B. Lind, Toronto; Hugh L. Macaulay, Chairman-designate, Toronto; William Dodge, Ottawa; J. Conrad Lavigne, Timmins; Robert H. Hay, Kingston. In absentia: Robert M. Schmon, St. Catharines; Allen T. Lambert, Toronto.

title Social Responsibility. The new Vice-Chairman of the Board, Mr. Hugh Macaulay, became its Chairman. Its function is to advise the Board and make recommendations with respect to Hydro's objectives, policies, and programs as they relate to its social responsibilities as a large public corporation serving the citizens of Ontario.

These two new committees bring to four the Board's standing committees, the others being Audit and Finance. Their establishment reflects a continuing effort on the part of the Hydro Board to discharge its responsibilities to its public as effectively as possible.

The third ad hoc committee, which reviewed relations between the Provincial Government and Hydro, was not established as a standing committee because discussions between Hydro and Government to develop a memorandum of understanding between the two have now been underway for some months and are expected to be finalized shortly. The committee will then be disbanded.

Such a memorandum would satisfy a recommendation of the report of Task Force Hydro that a contract be agreed to by Government and Hydro setting out their respective responsibilities. The Management Board of the Cabinet subsequently suggested a memorandum of understanding to reach the same objective.

On behalf of the Board, I would once again express its appreciation to all those individuals and groups whose help, assistance, and advice are always so deeply appreciated.

Our thanks are extended to the people of the municipal utilities of Ontario and their associations, the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities, for another year's outstanding performance. The Board also wishes to express its appreciation to the members of the Provincial Steering Committee for the Restructuring of Municipal Utilities, which was dissolved at year end, its work virtually complete. Chairman Syd Baldwin and his colleagues since 1975 have provided helpful guidance and encouragement to local study teams engaged in the difficult task. At the end of 1978, the number of municipal utility systems in the province stood at 334, compared with 353 when the restructuring program began.

We would also like to thank the Minister of Energy and his staff for their support and understanding, as well as all those ministries and agencies with which Hydro deals.

To the staff of Ontario Hydro, the Board wants me to express a special word of thanks and appreciation for their unceasing efforts and dedication in serving the people of Ontario. They have never

faltered despite the heavy demands placed upon them and the stresses caused by frequently being under the spotlight in the public debate on the province's energy future.

In mid-December, Premier William Davis announced that Hugh Macaulay would become Chairman of Ontario Hydro, effective July 1. Mr. Macaulay joined the Board of Directors January 1 and was elected Vice-Chairman January 15, succeeding Dr. Robert Uffen, who remains a member of the Board. Robert Schmon, who was appointed to the Board in 1976, retired at the end of the year because of ill health. The Board wishes to express its appreciation for his important contribution to the affairs of the Corporation during his term of office.

On a personal note, I wish to express my deep appreciation to my colleagues on the Board of Directors and to all those Hydro people who have helped make my term of office among the most stimulating and rewarding years of my working career.

On behalf of the Board,

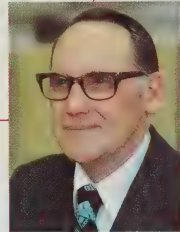
Robert B. Taylor
April, 1979

ORGANIZATION STRUCTURE

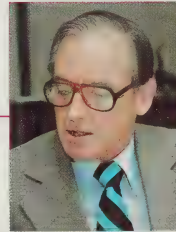


Robert Taylor
Chairman

BOARD OF DIRECTORS



Douglas Gordon
President



William Raney
Secretary and
General Counsel



John Matthew
Director
Audit Division



Milan Nastich
Executive Vice-President
Planning and
Administration



Harold Smith
Vice-President
Special Assignments



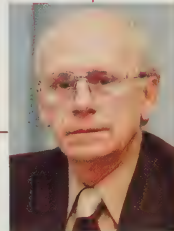
Henry Sissons
Vice-President
Corporate Relations



Arvo Niitenberg
Vice-President
Power System Program



Gordon McHenry
General Manager
Personnel



Frank Gomer
Vice-President
Resources



H.A. Jackson
Vice-President
Design and Construction



George Currie
Vice-President
Distribution and
Marketing

In November, 1978, Ontario Hydro introduced a major re-organization of its senior management structure designed to more clearly define the responsibilities of corporate planning and administration, and operational activities.

Faced with an increasingly complex and rapidly changing environment, the Ontario Hydro Board of Directors identified a need for highly flexible and carefully integrated planning and improved monitoring, control and accountability.

To this end it appointed two executive vice-presidents, one to direct the Corporate Planning and Administration group, the other the Operations group, which includes essentially all the functions associated with the provision of electric service.

Named Executive Vice-President, Planning and Administration, was Milan Nastich, former Vice-President, Resources. P.G. Campbell, Acting Vice-President, Engineering & Operations, became Executive

Vice-President of the Operations group.

The two new executive vice-presidents, along with Chairman Robert Taylor and President Douglas Gordon, comprise the newly established Executive Office. Functions of the former General Managers' Committee now come under a Senior Management Committee comprising the president, executive vice-presidents, vice-presidents and the secretary and general counsel.

Reporting to Milan Nastich in the Planning and Administration group:

Frank Gomer, Vice-President, Resources, in charge of the Resources branch which includes the former Personnel branch, the Economics division, Comptroller's division, Financial Information Systems division and Treasury division.

Arvo Niitenberg, Vice-President, Power System Program, in charge of a new Power System Program branch which includes System Planning division, Research division and the load forecasting function.

Henry Sissons, Vice-President, Corporate Relations, in charge of a new Corporate Relations branch responsible for the customer relations, public relations, government relations and employee communication functions and the co-ordination of public hearings.

Harold Smith, Vice-President, Special Assignments, in charge of a Reorganization Secretariat to

assist in completing the re-organization. Reporting to P.G. Campbell in the Operations Group:

George Currie, Vice-President, Distribution and Marketing, in charge of the Distribution and Marketing branch, which consists of the former Regions and Marketing branch except for the units performing load forecasting and certain customer relations functions. These are being transferred to branches in the Planning and Administration group.

H.A. Jackson, Vice-President, Design and Construction, in charge of the existing Design and Construction branch.

Harold Kennedy, Vice-President, Supply and Services, in charge of the Supply and Services branch, which includes the existing Services and Computer branches except for certain units performing public relations and communications functions. These are being transferred to the Corporate Relations branch. This branch will provide material procurement, computer, property and other services to all units of the organization.

Lorne McConnell, Vice-President, Production and Transmission, in charge of the former Operations branch, renamed Production and Transmission.

W.E. Raney, Secretary and General Counsel, continues to report respectively to the Board of Directors and to the president for his currently assigned functions (except for the transfer of the Internal Audit function to the new Audit division).

Earlier in October, the formation of a new Audit division was announced. J.G. Matthew was appointed Director of Audit, reporting to the president.

D.A. Dack was appointed to the position of Executive Assistant to the Chairman. His primary function is to provide direct assistance and advice to the chairman and the president on day-to-day corporate relations issues.



P.G. Campbell
Executive Vice-President
Operations



Lorne McConnell
Vice-President
Production and
Transmission



Dennis Gillman
General Manager
Computers



Harold Kennedy
Vice-President
Supply and Services

Export power sales again set new records

The demand for electrical energy by Ontario consumers increased only marginally during 1978 as the province's economy continued to lag and conservation practices intensified.

During 1978, primary energy



Equipment used in power plant construction, such as the cooling water intake shown above, often dwarfs the workmen.

demand totalled 95.4 billion kilowatt-hours, an increase of only 2.7 per cent over the previous year. This compares with an increase of 2.2 per cent in 1977.

While the increase in primary energy demand continues to be low, export power sales again set new records, increasing from 8.4 billion kilowatt-hours in 1977 to 10.4 billion kilowatt-hours in 1978. Revenue from these sales totalled \$285.2 million, yielding an estimated net benefit of \$120 million which is passed on to Ontario customers. All of the export sales were made to neighbouring utilities in Michigan and New York states.

Ontario Hydro's single major source of generation continued to be water power during 1978 — accounting for about 34 per cent of the total. Nuclear power production increased to 30 per cent of the total energy generated — 95.7 billion kilowatt-hours. To produce an equivalent amount of energy at coal-fired stations would have required burning about 8.8 million megagrams (9.7 million tons) of coal, an amount equal to the total quantity of coal Hydro used in 1977.

The annual all-time high

primary peak demand of 16,247,000 kilowatts was set on January 10 and was 2.2 per cent greater than the previous year's peak which occurred in January, 1977. This was only the second time since 1948 that the annual Ontario peak demand occurred in January rather than December.

The December 1978 peak demand of 15,722,000 kilowatts was slightly greater than the December 1977 peak. (Figures show that Hydro customers established an all-time record peak demand of 16,252,000 kilowatts on January 15, 1979.)

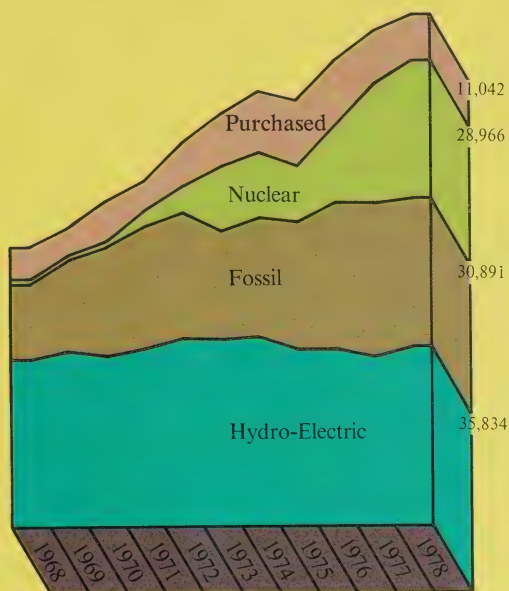
Dependable peak capacity at the time of the December peak was 22.8 million kilowatts which represented an increase of seven per cent over that of 1977. The new dependable peak capacity included a coal-fired unit at Nanticoke and a nuclear unit at Bruce coming into service, revisions to the dependable capacity of certain generating stations and an upward revision to the Manitoba purchase contract. The December dependable peak was made up of the following generation mix: 18.8 per cent nuclear; 51.6 per cent thermal; 28.0 per cent hydraulic; 1.6 per cent purchased.

Energy Made Available: 1978

	1978 Millions of kW·h	1977 Millions of kW·h	% Change Over 1977	% of Total 1978	% of Total 1977
Hydraulic	35,834	33,546	6.8	33.6	32.8
Coal	27,073	26,309	2.9	25.4	25.8
Natural gas	2,079	4,051	-48.7	2.0	4.0
Oil	1,739	1,564	11.2	1.6	1.5
Nuclear	28,966	24,488	18.3	27.1	24.0
Total generation	95,691	89,958	6.4	89.7	88.1
Energy received	11,042	12,186	-9.4	10.3	11.9
Total energy made available ...	106,733	102,144	4.5	100.0	100.0

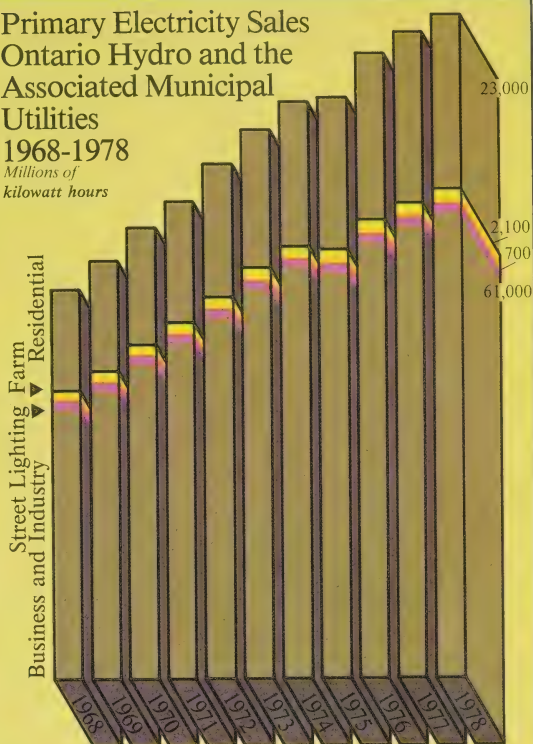
Energy Made Available 1968-1978

Millions of
kilowatt hours

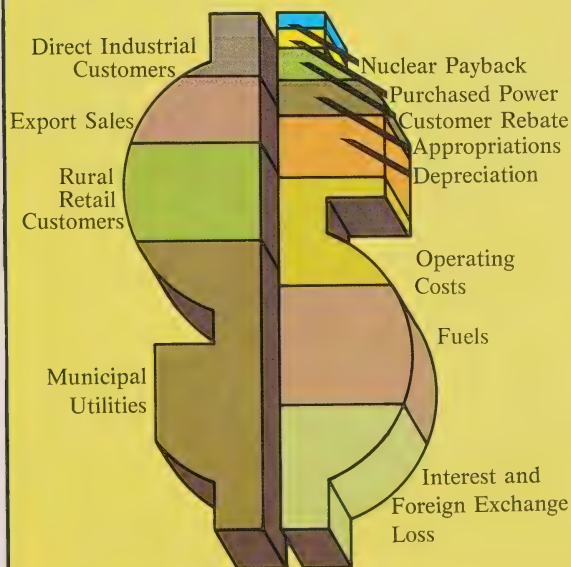


Primary Electricity Sales Ontario Hydro and the Associated Municipal Utilities 1968-1978

Millions of
kilowatt hours

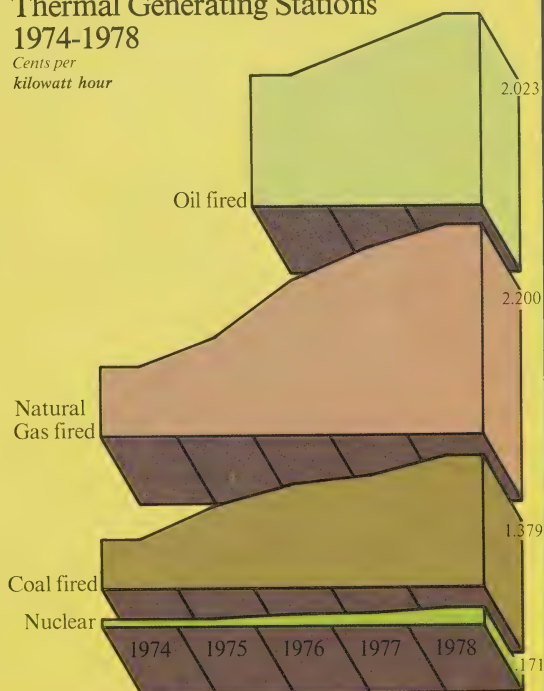


Where Each Hydro Dollar came from went to



Average Cost of Fuel Consumed by Thermal Generating Stations 1974-1978

Cents per
kilowatt hour



Municipal utilities structure streamlined

During 1978 power was supplied under cost contracts to 334 associated municipal electrical utilities for resale to approximately 2,058,000 retail customers. In addition, the Ontario Hydro rural distribution system provided electrical service to some 785,000 customers located outside the areas served by municipal utilities, while 100 large industrial customers received direct service under special contract.

In April of 1978 the Hydro Board of Directors notified the Minister of Energy that rising costs necessitated average rate

increases of 9.8 per cent to municipal utilities and 10.1 per cent to industrial customers. The application was reviewed and approved by the Ontario Energy Board and was subsequently confirmed by Hydro's Board of Directors to become effective January 1, 1979.

As a result of higher than anticipated secondary revenues and lower than anticipated costs, the Board notified the Minister of Energy of excess revenues for 1977 and 1978. Of the 1977 excess revenues of \$122 million, \$120 million, together with interest,

was applied to reduce customers' bills in 1978, in accordance with Anti-inflation Board guidelines. The 1978 excess revenues of \$130 million and the 1977 remaining balance, together with interest are being applied to reduce customers' bills in 1979.

The electrical utility restructuring program, which was planned in 1975, resulted in a streamlining of municipal utilities in the regional municipalities of Waterloo and Peel and the County of Oxford and portions of the York Regional Municipality during 1978. A total of 31,000 customers of Ontario Hydro's rural system was transferred to municipal utilities in 1978.

At year end, restructuring studies were also in the final stages in the Regional Municipalities of Hamilton-Wentworth, Halton and Sudbury and legislation was pending for restructured utilities in the Regional Municipality of Niagara.

Its work virtually completed, the Provincial Steering Committee for the Restructuring of Municipal Utilities was dissolved at year end. This committee, composed of representatives from both the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities as well as Ontario Hydro, the Provincial Government and the Provincial Municipal Liaison Committee, had supervised the program since 1975 providing guidance on policy matters and technical assistance to local study teams which had been charged with the responsibility of recommending utility restructuring in their specific areas.



A cashier in Hydro's Bowmanville office cheerfully deals with a customer's inquiry.

FINANCIAL SECTION

Financial Review

Ontario Hydro's 1978 operating results showed a decline in net income as compared with 1977. Net income for 1978 was \$147 million as compared with \$194 million in 1977. In 1978, however, income was reduced by an extraordinary charge of \$21 million which arose from the cancellation in April, 1978 of two of the four oil-fuelled generating units then under construction at Wesleyville.

Total 1978 revenues of \$2,268 million exceeded amounts allowed within the spirit and intent of the Anti-Inflation program by \$130 million. These excess revenues, together with interest, will be applied to reduce customers' bills in 1979.

Revenues from sales of primary power and energy in 1978 were \$1,979 million, 13% higher than the previous year. This increase resulted mainly from higher rates and to a lesser extent, increases in the volume of sales.

Revenues from sales of secondary energy in 1978 amounted to \$289 million, \$79 million or 38% higher than in 1977. The greater demand for secondary energy by United States utilities and higher rates accounted for the increase in 1978.

Total costs, excluding financing charges and the extraordinary item, were \$1,421 million in 1978 compared to \$1,250 million in 1977, an increase of 14%. Operation, maintenance and administration costs were higher by \$88 million as a result of increases in wage and salary rates, staff levels, prices paid for materials and services, and included \$15 million for the costs of mothballing the second half of Bruce Heavy Water Plant "D". Fuel used for electric generation increased by \$45 million in 1978 because of higher prices and volumes. Power purchased was higher by \$22 million mainly as the result of increases in prices, partially offset by lower volumes purchased. Charges for energy produced by generating units during commissioning amounted to \$22 million in 1978. Depreciation costs rose \$49 million in 1978 to \$265 million, mainly as the result of units being placed in service at Bruce and Nanticoke generating stations.

Interest expense increased in 1978 by \$112 million. This represents an increase of 27% over 1977 and is primarily the result of new borrowings during the year together with interest payments on foreign bonds being made at higher rates of exchange. The foreign exchange losses of \$29 million in 1978 were comprised of a loss of \$48 million partly offset by foreign exchange gains from redemption and translation of foreign monetary assets and liabilities. The \$48 million loss resulted from Ontario Hydro calling, on November 6, 1978, a 7.75% bond issue of 150 million Swiss francs due in 1980. This issue was refinanced by a note of the same amount payable to a Swiss bank bearing interest at the rate of 2.625% and with the same maturity date. If the refinancing had not taken place, the exchange loss would normally have been charged to operations in 1979. However, in order to obtain the benefit of a lower interest rate the bond issue was refinanced in 1978, with resultant savings in interest of approximately \$10 million over the period to maturity in 1980.

The amount of net income appropriated for debt retirement as required by The Power Corporation Act, increased by \$15 million in 1978 to \$113 million. \$34 million of net income was also appropriated for the stabilization of rates and contingencies as compared to \$95 million in 1977.

Net additions to fixed assets in 1978 were \$1,652 million, increasing fixed assets in service and under construction to \$13,200 million. Major capital expenditures in 1978 included \$902 million for generation facilities, \$240 million for transmission facilities, and \$256 million for heavy water plants and facilities. The major expenditures for generating stations were \$296 million at Pickering G.S., \$263 million at Bruce G.S., \$103 million at Wesleyville G.S., and \$101 million at Thunder Bay G.S. At December 31, 1978 the costs of fixed assets in service and under construction were:

Asset Classification	In-Service Cost \$ million	Under Construction Cost \$ million
Generation facilities	5,894	2,156
Transmission facilities	2,111	379
Retail distribution facilities	741	4
Heavy water production facilities	368	1,094
Administration and service facilities	435	18
TOTAL	9,549	3,651

Funds provided from operations during 1978 were \$433 million while net borrowing provided \$1,235 million. Compared to 1977, these increased by \$24 million and \$261 million respectively. In addition, increases in accounts and interest payable amounted to \$150 million in 1978.

Proceeds from issues of long-term bonds, notes and other long-term debt during 1978, totalled \$1,847 million comprising: Canadian currency issues of \$800 million, issues in United States currency of \$825 million (Can. \$931 million), a note of 150 million Swiss francs (Can. \$106 million) and \$10 million of capitalized lease obligations. Retirement of long-term debt during the year amounted to \$357 million, an increase of \$79 million over 1977. The average coupon interest rate of bond issues in 1978 was 9.3%, as compared to an average rate in 1977 of 8.8%. Short-term notes outstanding at year-end amounted to \$25 million, a decrease of \$20 million from 1977.

Major applications of funds, in addition to the expenditure of \$1,652 million on fixed assets, were increases in fuel, materials and supplies of \$65 million, increases in advance payments for fuel supplies of \$46 million, and increases in accounts receivable and other assets of \$45 million.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1978 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

As explained in notes 5 and 13(a), the second half of Bruce Heavy Water Plant "D" and the Wesleyville Generating Station have been deferred and it is not known when these assets will be used; and, as explained in note 13(b), decisions have been deferred concerning

the construction program on the first half of Bruce Heavy Water Plant "D" and on the Bruce "B", Darlington and Atikokan generating stations.

In our opinion, subject to the effect, if any, on the financial statements of the ultimate resolution of the uncertainties discussed in the preceding paragraph, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1978 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 12, 1979

CLARKSON, GORDON & CO.
Chartered Accountants

Summary of Significant Accounting Policies

The accompanying financial statements have been prepared by management in accordance with accounting principles generally accepted in Canada, applied on a consistent basis. Because a precise determination of the carrying values of some assets and liabilities is dependent upon future events, the financial statements necessarily include estimates and approximations. These have been made using careful judgement and in the light of information available up to March 12, 1979. The financial statements, in management's opinion, have been properly prepared within reasonable limits of materiality and within the framework of the accounting policies summarized below.

Fixed assets

Fixed assets include power supply facilities (generation, transmission and distribution); administration and service facilities (land, buildings, transport and service equipment); and heavy water production facilities.

The cost of additions and replacement of component units is capitalized. This cost includes material, labour, engineering, and overhead costs for administration, procurement and other services that are considered applicable to the capital construction program. In addition, the net cost of commissioning generating units is capitalized. This net cost represents the cost of material, labour, fuel and applicable overheads associated with the start-up, testing, and checking into service of generating units, less the value attributed to energy produced by units during their commissioning period. The commissioning period extends from the date of the initial start-up and testing of generating units to the date they are placed in service with an acceptable operating reliability.

In the case of nuclear generation facilities, cost also includes the cost of heavy water purchased and produced. The cost of producing heavy water includes the direct costs of production, applicable overheads, interest, and depreciation of the heavy water production facilities.

Interest is capitalized on construction and commissioning costs at effective annual rates of 9.9% in 1978 and 9.4% in 1977. These rates approximate the average cost of long-term funds borrowed in the years in which expenditures have been made for fixed assets under construction. Interest is capitalized on land costs during the construction and commissioning period; interest is not capitalized on land held for future use.

If a project is cancelled, all costs, including the costs of cancellation, are written off to operations. If a project is deferred after construction has started, mothballing costs associated with the deferral are charged to operations. Interest is not capitalized on deferred projects during the period of their deferral.

For normal retirements, the cost of assets retired is charged to accumulated depreciation with no gain or loss being reflected in operations. For unusual or premature retirements, the gains or losses on assets retired are reflected in operations. For all retirements, the costs of removal, less salvage proceeds, are reflected in current operations as an adjustment to depreciation expense in the year of retirement.

Depreciation

Since January 1, 1971, all additions to fixed assets and the net book value of thermal-electric generating stations in service at the end of 1970 have been depreciated using the straight-line method. All other assets in service at the end of 1970 continue to be depreciated on the sinking fund method. Depreciation rates for the various classes of assets are based on the estimated service lives, which are subject to periodic review. The service lives of major asset classes are:

Generation facilities — Hydro-electric	50 to 100 years
— Thermal-electric	30 years
Transmission and distribution facilities	25 to 50 years
Administration and service facilities	5 to 60 years
Heavy water production facilities	20 years

Since 1971, the costs of minor deferred projects have been amortized on a straight-line basis. Commencing in 1979, the costs of major deferred projects will be amortized on a basis yet to be determined.

Nuclear agreement — Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Ontario Hydro is required to make monthly payments until the year 2001 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Commissioning energy

Revenues from the sale of power and energy include revenues from energy produced by generating units during the commissioning period. A charge is included in the cost of operations for the value attributed to the energy produced during the commissioning period. This charge is equivalent to the operating and fuel costs of producing the same quantity of energy at generating units displaced because of the commissioning activity.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for or withdrawal from the stabilization of rates and contingencies reserve is an amount established to maintain a sound financial position and to stabilize the effect of abnormal cost fluctuations.

Foreign currency translation

Long-term debt payable in foreign currencies is translated to Canadian currency at rates of exchange at the time of issue. Current monetary assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange. The resulting translation gains or losses, together with realized exchange gains or losses, are credited or charged to operations.

Advance payments for fuel supplies

As part of its program to ensure the adequate supply of fuels for its generating stations, Ontario Hydro has entered into long-term contracts for the supply of coal, oil and uranium. Where these contracts require Ontario Hydro to make payments in advance of product delivery, the prepayments and associated costs such as interest are carried in the accounts as advance payments for fuel supplies. These advance payments are to be amortized as part of the cost of the fuels delivered under the contracts or are to be recovered over periods which do not exceed the life of the contracts.

Pension and Insurance Plan

The Pension and Insurance Plan is a contributory, defined benefit plan covering all regular employees of Ontario Hydro. The pension costs for each period include current service costs and amounts required to amortize any unfunded obligation. The most recent actuarial valuation of the pension plan, at December 31, 1977, reported an unfunded obligation of Ontario Hydro of approximately \$133 million. Of this amount:

- \$87 million, representing accumulated experience deficiencies and deficits resulting from changes in actuarial assumptions, was amortized in 1978 on a five year basis. Commencing on January 1, 1979, it is intended to amortize these deficiencies and deficits on a fifteen year basis; accordingly the remaining balances at December 31, 1978 will be amortized over the years 1979 through 1992. This change will reduce the amortization for 1979 by approximately \$15 million.
- \$46 million, representing an unfunded liability with respect to improved benefits, is being amortized on a fifteen year basis to 1991.

Statement of Operations for the year ended December 31, 1978

	1978	1977
	\$'000	\$'000
Revenues		
Primary power and energy		
Municipal utilities	1,275,107	1,108,099
Retail customers	442,224	407,382
Direct customers	261,816	243,560
	<u>1,979,147</u>	<u>1,759,041</u>
Secondary power and energy	288,533	210,046
	<u>2,267,680</u>	<u>1,969,087</u>
Less excess revenues (note 1)	130,292	122,093
	<u>2,137,388</u>	<u>1,846,994</u>
Costs		
Operation, maintenance and administration	501,800	414,307
Fuel used for electric generation	487,037	441,902
Power purchased	97,949	75,842
Nuclear agreement — payback	46,936	49,643
Commissioning energy	21,866	52,322
Depreciation	265,060	215,601
	<u>1,420,648</u>	<u>1,249,617</u>
Income before financing charges and extraordinary item	<u>716,740</u>	<u>597,377</u>
Interest (note 2)	519,449	407,552
Foreign exchange losses (gains) (note 3)	29,346	(3,724)
	<u>548,795</u>	<u>403,828</u>
Income before extraordinary item	<u>167,945</u>	<u>193,549</u>
Extraordinary item (note 4)	20,500	—
Net income	<u>147,445</u>	<u>193,549</u>
Appropriation for:		
Debt retirement as required by The Power Corporation Act.	113,446	98,078
Stabilization of rates and contingencies	33,999	95,471
	<u>147,445</u>	<u>193,549</u>

See accompanying summary of significant accounting policies and notes to financial statements

Statement of Financial Position as at December 31, 1978

Assets	1978	1977
	\$'000	\$'000
Fixed assets		
Fixed assets in service, at cost.	9,549,008	8,423,173
Less accumulated depreciation.	<u>1,859,391</u>	<u>1,607,067</u>
	7,689,617	6,816,106
Fixed assets under construction, at cost (note 5)	<u>3,651,344</u>	<u>3,137,872</u>
	<u>11,340,961</u>	<u>9,953,978</u>
 Current assets		
Cash and short-term investments (note 6)	692,884	447,973
Accounts receivable.	254,785	256,035
Fuel for electric generation, at cost	409,781	357,502
Materials and supplies, at cost.	<u>112,129</u>	<u>99,271</u>
	1,469,579	1,160,781
 Other assets		
Advance payments for fuel supplies (note 7)	140,703	95,077
Long-term investments (note 8)	59,555	68,623
Unamortized debt discount and expense	105,635	91,003
Long-term accounts receivable and other assets	<u>46,073</u>	<u>16,173</u>
	351,966	270,876
	<u>13,162,506</u>	<u>11,385,635</u>

See accompanying summary of significant
accounting policies and notes to financial statements.

Liabilities	1978	1977
	\$'000	\$'000
Long-term debt		
Bonds and notes payable (note 9)	10,129,119	8,640,531
Other long-term debt (note 10)	269,556	268,232
	<u>10,398,675</u>	<u>8,908,763</u>
Less payable within one year.	171,912	212,910
	<u>10,226,763</u>	<u>8,695,853</u>
Current liabilities		
Accounts payable and accrued charges	512,843	428,086
Short-term notes payable	25,415	44,935
Accrued interest	273,579	217,647
Long-term debt payable within one year.	171,912	212,910
Excess revenues payable (note 1)	132,544	122,093
Estimated liability on cancellation of capital construction projects . . .	16,657	7,348
	<u>1,132,950</u>	<u>1,033,019</u>
Equity		
Equities accumulated through debt retirement appropriations	1,391,181	1,279,667
Reserve for stabilization of rates and contingencies	284,917	250,401
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	<u>1,802,793</u>	<u>1,656,763</u>
	<u>13,162,506</u>	<u>11,385,635</u>

On behalf of the Board



Chairman



President

Toronto, Canada
March 12, 1979

**Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1978**

	Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
		Munici- palities	Retail Customers	Direct Customers	1978	1977
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	288,214	1,144	(32,324)	(6,633)	250,401	155,025
Appropriation	31,825	104	(988)	3,058	33,999	95,471
Deficit recovered from municipalities on annexations	(130)	—	751	—	621	—
Payment to Ontario Municipal Electric Association (note 11)	—	(104)	—	—	(104)	(95)
Balances at end of year	<u>319,909</u>	<u>1,144</u>	<u>(32,561)</u>	<u>(3,575)</u>	<u>284,917</u>	<u>250,401</u>

**Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1978**

	Municipalities	Power District (Retail and Direct Customers)	Totals	
			1978	1977
	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	881,022	398,645	1,279,667	1,181,569
Add:				
Debt retirement appropriation	75,858	37,588	113,446	98,078
Annexation transfers and refunds	11,041	(12,973)	(1,932)	20
Balances at end of year	<u>967,921</u>	<u>423,260</u>	<u>1,391,181</u>	<u>1,279,667</u>

See accompanying summary of significant accounting
policies and notes to financial statements.

**Statement of Changes in
Financial Position
for the year ended December 31, 1978**

	<u>1978</u>	<u>1977</u>
	\$'000	\$'000
Source of Funds		
Operations		
Income before extraordinary item	167,945	193,549
Depreciation, a charge not requiring funds in the current year	<u>265,060</u>	<u>215,601</u>
	433,005	<u>409,150</u>
Financing		
Long-term debt		
Bonds, notes and other long-term debt issued ..	1,846,530	1,406,720
Less retirements	<u>356,618</u>	<u>276,655</u>
	1,489,912	1,130,065
Short-term notes payable — (decrease)	(19,520)	(83,805)
Cash and investments — (increase)	<u>(235,843)</u>	<u>(71,961)</u>
	1,234,549	<u>974,299</u>
Increase in excess revenues payable (note 1)	10,451	122,093
Increase in accounts and interest payable including estimated liability on cancellation of capital construction projects	<u>149,998</u>	<u>100,133</u>
	<u>1,828,003</u>	<u>1,605,675</u>
Application of funds		
Net additions to fixed assets	1,652,043	1,413,120
Increase in advance payments for fuel supplies	45,626	57,169
Increase in fuel, materials and supplies	65,137	77,947
Increase in accounts receivable and other assets	44,697	57,439
Extraordinary item (note 4)	20,500	—
	<u>1,828,003</u>	<u>1,605,675</u>

See accompanying summary of significant accounting policies
and notes to financial statements.

Notes to financial statements

1. Anti-Inflation program

Ontario Hydro was subject to the guidelines under the Federal Anti-Inflation program in the matter of employee compensation to December 31, 1978, the date on which the program terminated. Management is of the opinion that Ontario Hydro has complied with the requirements of the anti-inflation legislation. Ontario Hydro has also been required by the Province of Ontario to conform with the spirit and intent of the Federal Anti-Inflation program as it applied to net income. As a result of higher than anticipated secondary revenues and lower, than anticipated costs, the Corporation had excess revenues in 1977 and 1978. Of the 1977 excess revenues of \$122 million, \$120 million, together with interest, was applied to reduce customers' bills in 1978. The 1978 excess revenues of \$130 million and the 1977 remaining balance, together with interest, will be applied to reduce customers' bills in 1979.

2. Interest

	1978	1977
	\$'000	\$'000
Interest costs consisted of:		
Interest on bonds, notes, and other debt	899,817	753,251
Less:		
Interest capitalized on fixed assets under construction	298,771	279,492
Interest charged to advance payments for fuel supplies	5,348	4,132
Interest earned on short-term and long-term investments	70,457	56,874
Net gain on redemption of bonds and sale of investments	5,792	5,201
	<u>380,368</u>	<u>345,699</u>
	<u>\$19,449</u>	<u>407,552</u>

3. Foreign exchange losses (gains)

	1978	1977
	\$'000	\$'000
Foreign exchange losses (gains) consisted of:		
Net exchange (gain) on redemption and translation of foreign monetary assets and liabilities	(18,932)	(3,724)
Exchange loss on refinancing of Swiss bond issue	48,278	—
	<u>29,346</u>	<u>(3,724)</u>

4. Extraordinary item

In February 1978 the Board of Directors initiated a review of the construction program, following receipt of a revised load forecast projecting a substantially lower rate of growth than previously forecast. As a consequence of this review, two of the four oil-fuelled generating units then under construction at Wesleyville were cancelled. The cost of cancellation of these two units is \$20.5 million which has been recorded as an extraordinary charge against income in 1978. (See note 13(a) for the subsequent deferral of construction of the remaining two units.)

5. Fixed assets under construction

	1978	1977
	\$'000	\$'000
Fixed assets under construction consisted of:		
Construction in progress	3,463,543	3,076,852
Deferred projects	124,542	7,963
Land held for future use	63,259	53,057
	<u>3,651,344</u>	<u>3,137,872</u>

In December 1978, the Board of Directors, following receipt of a report on the status of Bruce Heavy Water Plant "D" and on the heavy water supply and demand situation, approved a program to stop construction and store the components of the second half of Bruce Heavy Water Plant "D" and restrict expenditures accordingly. Capital expenditures of \$120 million incurred on the second half of this plant were transferred to deferred projects on December 31, 1978. Approximately \$10 million will be spent to bring construction of this half to a point where it can be safely mothballed and stored. Mothballing costs associated with deferment of this half, estimated at approximately \$15 million, were charged to 1978 operations. It is uncertain at this time when the second half of the plant will be used. (See note 13(b) for the subsequent decision relating to the first half of Bruce Heavy Water Plant "D".)

6. Cash and short-term investments

	1978	1977
	\$'000	\$'000
Cash and short-term investments are recorded at cost (approximately market value) and consisted of:		
Cash and interest bearing deposits with banks and trust companies	595,929	296,528
Corporate bonds and notes	77,074	82,930
Government and government-guaranteed bonds	19,881	68,515
	<u>692,884</u>	<u>447,973</u>

7. Advance payments for fuel supplies

	1978	1977
The advance payments consisted of:	\$'000	\$'000
Coal supply	69,181	58,589
Uranium supply	71,522	—
Residual fuel oil supply	—	36,488
	<u>140,703</u>	<u>95,077</u>

Based on present commitments, additional advance payments for fuel supplies, excluding interest, will total approximately \$541 million over the next five years (including approximately \$151 million in 1979).

8. Long-term investments

	1978	1977
These investments are recorded at amortized cost and consisted of:	\$'000	\$'000
Government and government-guaranteed bonds	<u>59,555</u>	<u>68,623</u>

Market value of these investments at December 31, 1978 was \$46 million. (1977 — \$58 million)

9. Bonds and notes payable

Bonds and notes payable, expressed in Canadian dollars, are summarized by years of maturity and by the currency in which they are payable in the following table:

Years of maturity	1978			Weighted Average Coupon Rate	1977	
	Principal outstanding \$'000				Principal outstanding \$'000	Weighted, Average Coupon Rate
	Canadian	Foreign	Total			
1978	—	—	—		204,131	
1979	141,106	20,242	161,348		151,759	
1980	113,050	227,056	340,106		256,785	
1981	238,068	94,473	332,541		302,697	
1982	206,434	183,787	390,221		455,180	
1983	171,756	207,511	379,267		—	
1 - 5 years	870,414	733,069	1,603,483	7.2%	1,370,552	7.3%
6 - 10 years	346,284	796,071	1,142,355	7.5	1,212,890	7.4
11 - 15 years	230,761	240,494	471,255	7.6	614,870	7.2
16 - 20 years	995,389	414,967	1,410,356	8.0	1,153,753	8.1
21 - 25 years	1,183,668	652,562	1,836,230	9.3	1,932,226	9.1
26 - 30 years	1,536,373	2,129,067	3,665,440	9.2	2,356,240	9.0
	<u>5,162,889</u>	<u>4,966,230</u>	<u>10,129,119</u>		<u>8,640,531</u>	
<u>Currency in which payable</u>						
Canadian dollars		5,162,889			4,555,260	
United States dollars		4,679,236			3,842,686	
West German Deutsche marks		124,055			127,924	
Swiss francs		162,939			114,661	
		10,129,119			8,640,531	

Bonds and notes payable in United States dollars include \$3,420 million (1977-\$2,651 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario issues sold in the United States on behalf of Ontario Hydro. Except for these issues and a note of \$106 million payable in Swiss francs, all bonds and notes payable are guaranteed as to principal and interest by the Province of Ontario.

Long-term bonds and notes payable in foreign currencies are translated into Canadian currency at rates of exchange at time of issue. If Ontario Hydro were to translate the face value of its foreign bonds and notes payable at rates of exchange on December 31, 1978, the total amount of these liabilities would have to be increased by \$873 million.

10. Other long-term debt

	1978	1977
	\$'000	\$'000
Other long-term debt consisted of:		
(a) The balance due to Atomic Energy of Canada Limited for the purchase of Bruce Heavy Water Plant "A". Under the purchase agreement, Ontario Hydro pays equal monthly instalments of blended principal and interest to December 28, 1992, with interest at the rate of 7.795%	216,184	224,486
(b) Capitalized lease obligation for the head office building at 700 University Avenue, Toronto. The lease obligation is for the 30-year period ending September 30, 2005, payable in United States dollars at an effective interest rate of 8%	43,457	43,746
(c) Capitalized lease obligations for transport and service equipment. Under these agreements, payments of equal monthly instalments of blended principal and interest will be made to 1988, at effective interest rates ranging from 6.8% to 10.4%	9,915	—
	<u>269,556</u>	<u>268,232</u>

Payments required on the above debt, exclusive of interest, will total \$61 million over the next five years. The amount payable within one year is \$10.6 million. (1977 — \$8.8 million)

11. Payment to Ontario Municipal Electric Association

The amount of this payment is equivalent to interest on the balance held for the benefit of Municipalities in the Reserve for Stabilization of Rates and Contingencies.

12. Reclassification of 1977 amounts

In prior years,

- (a) foreign exchange gains or losses were included in interest costs; and
- (b) the revenues from primary power and energy were not detailed by class of customer.

To be consistent with the 1978 presentation, 1977 amounts have been reclassified in the Statement of Operations.

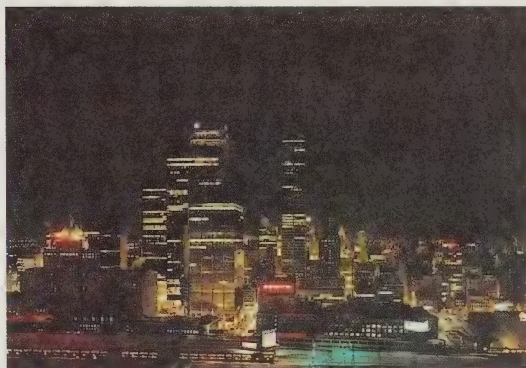
13. Subsequent events

(a) At its meeting on February 12, 1979, the Board of Directors approved a load forecast which predicted an average annual compound growth rate to 1987 of 4.65% which is lower than the 5.4% previously forecast. As a result of this revision, the Board of Directors decided to stop construction and store the components of Wesleyville generating station until the early 1990's. Capital costs of \$192 million had been incurred to December 31, 1978 and approximately \$45 million will be spent to bring construction of the project to a point where it can be safely mothballed and stored. Mothballing costs associated with this deferment, which are estimated to be approximately \$35 million, will be charged to 1979 operations.

It was further decided to review the possibility of a deferment or cancellation of the coal-fired Atikokan generating station and an extension of the construction schedules for the Darlington and Bruce "B" nuclear generating stations.

(b) At its meeting on March 12, 1979, the Board of Directors decided, pending additional study, to defer any further decisions on the Bruce "B" and Darlington nuclear generating stations, the Atikokan coal-fired generating station and the first half of Bruce Heavy Water Plant "D" until its April 1979 meeting. Capital costs totalling \$313 million had been incurred to December 31, 1978 on these generating stations and \$200 million on the first half of Bruce Heavy Water Plant "D".

Conservation program pays dividends



These photos, taken of Toronto's skyline on March 3, 1978 at 6:30 p.m. (left) and 10:30 p.m. show dramatically how businesses are reducing office lighting during off hours.

As the cover of this year's annual report reflects, Ontario Hydro continued to stress energy conservation both through information and advertising programs and in consulting services to business and industry.

These programs began to pay dividends as business readily responded to Hydro's offer of assistance. Noteworthy among them was a major conservation program at the giant Commerce Court complex in downtown Toronto. The bank managed to reduce consumption of electricity by 17 million kilowatt-hours in six months and over one year cut its electricity bill by \$180,000.

Other large office complexes have begun to pick up the energy conservation message and Hydro, along with local municipal utilities, has pursued the objective through participation with such groups as the influential Building Owners and Managers Association. Some 80 office buildings surveyed in 1976 were re-surveyed in 1978 and an average reduction in energy use of 10 per cent was indicated.

In the retail sector, Hydro

sponsored energy seminars which encouraged retailers to take a hard look at lighting levels with resulting benefits in reduced load. Among them was the Canadian Tire Corporation which subsequently adopted a corporate-wide policy reducing required minimum lighting in its stores by 50 per cent after experiments in Milton and Kingston produced significant cost reductions.

Load management

While energy conservation efforts are producing significant savings for business and industry today, Hydro is committed to fostering long term programs to reduce the demands on its system.

The Corporation's commitment to load management — controlling customer demand for limited periods — reached the customer level early in 1978 with the decision to embark on major test programs with two municipal utilities in Oshawa and Scarborough. More than \$3 million will be expended on these programs over the next three years with special load

management metering equipment slated for installation in 650 homes. Heat storage furnaces will also be initiated in four homes, two in each municipality. These will store energy during off peak hours, then transmit the stored heat on their own during other hours. In addition, 50 special size water heaters are included in test installations across the two municipalities to operate on the same principle.

Discussions have also commenced with Canadian industry to develop heat storage systems for consumer use and for manufacturing.

While conservation efforts continued to gain momentum outside the corporation, inside, the employees took Hydro's own TRIM program in stride. These internal efforts to discover and implement cost effective conservation measures in 1978 resulted in a further cutback in energy consumption of 6.5 per cent — equivalent to 60 million kilowatt-hours — after having achieved a 12.5 per cent reduction in 1977.

The prime concern is provision of power

Ontario Hydro, a special statutory corporation established by the Provincial Legislature in 1906, has broad powers to produce, buy, and deliver electric power throughout the Province of Ontario. It now operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c.354 as amended.

The Corporation is administered by a Board of Directors that consists of a chairman, a vice-chairman, a president, and not more than ten other directors. An Executive Office, composed of the chairman, the president and the two executive vice-presidents, concentrates on overall corporate objectives and policies.

The prime concern of the Corporation is the provision of electric power to municipalities for resale to the people of the Province. Ontario Hydro also provides power to over 100 large, direct industrial customers and to 785,000 retail customers either in rural areas or in communities not served by municipal electric utilities.

Ontario Hydro also exercises

certain regulatory functions with respect to the electrical service provided by municipalities and maintains seven regional offices and 59 area offices suitably located throughout the Province.

With an operational area extending approximately 1,610 kilometres (1,000 miles) from east to west and covering about 647,500 square kilometres (250,000 square miles), Ontario Hydro is Canada's largest electrical utility and is one of the largest in North America.

Part of a vast network

The Corporation has interconnections in Canada with Manitoba Hydro and the northwestern section of the Hydro-Quebec system and also has major interconnections with Michigan and New York states in the United States. Through its interconnections the Ontario Hydro system is effectively part of a vast electrical network joining together most of the central and eastern portions of the United States and the Canadian provinces of Saskatchewan, Manitoba, New Brunswick, Prince Edward Island,

Nova Scotia and parts of Quebec.

Ontario Hydro is a financially self-sustaining corporation that derives no revenue from taxes.

The Power Corporation Act by which Hydro is governed stipulates that service be provided at cost. The Act defines cost as including charges for power purchases, operation, maintenance, administration, fixed charges and reserve adjustments. Fixed charges include interest, depreciation and the provisions for the retirement of debt over a 40-year period.

The Province of Ontario guarantees the payment of principal and interest on bonds and notes issued to the public by Ontario Hydro. In the case of public borrowing in the United States, the Province borrows on behalf of Hydro by issuing its own debentures and advancing the proceeds to Ontario Hydro upon terms and conditions agreed upon between the Corporation and the Treasurer of Ontario.

Higher achievements sought in health and safety

Ontario Hydro continued its efforts to achieve higher performance in employee and public health and safety during 1978.

The senior management committee on safety, The Safety Policy Committee, issued a revised general safety policy statement, established a corporate performance standard with respect to occupational fatalities, and arranged for a new system of employee representatives input to safety policy. Despite these initiatives, Hydro's health and safety record remained about the

same as that achieved in 1977.

There were five occupational fatalities in the year for a fatality rate of 11 per million manhours — the same as in 1977. The overall corporate disabling injury rate was seven lost-time injuries per million manhours worked, and the medical attention frequency injury rate was 36 per million manhours — the same as 1977.

A high standard of performance in radiological safety was again recorded in 1978, with no occupational or public fatalities or injuries due to exposure to radiation in the nuclear program.

The control of Polychlorinated Biphenyls (PCBs) received considerable attention. A corporate policy on the use of PCBs by Ontario Hydro was issued; assistance was provided to municipal utilities and the Fire Marshal's Office in the safe handling of this toxic agent. A corporate research and development program was initiated for total destruction of PCBs.

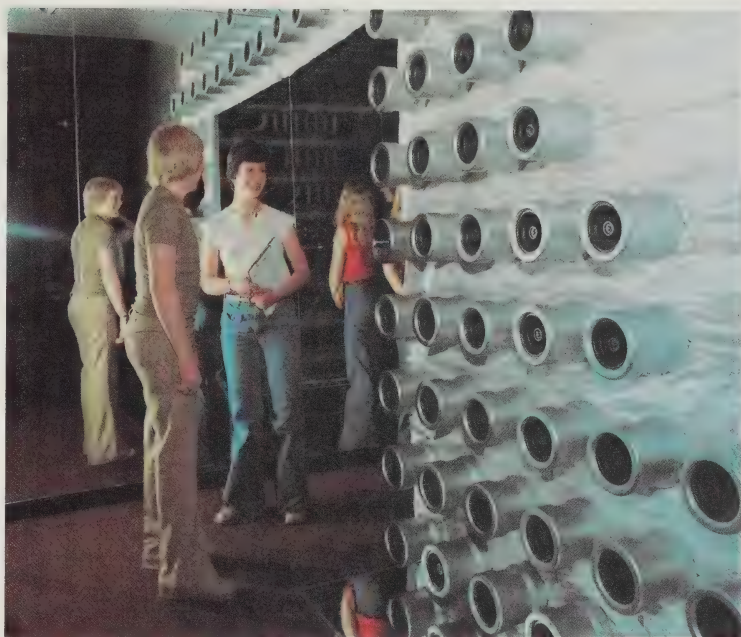
Exploration for uranium continued in 1978

During 1978 Ontario Hydro continued its involvement in uranium exploration programs being carried out by Shell Canada Limited, Amok Limited and Norcen Energy Resources, and acquired an interest in a program being carried out by Canadian Nickel Company Limited.

Engineering and environmental studies were initiated by Norcen Energy Resources Limited on the Blizzard uranium property in British Columbia with a view to possible mining development. Ontario Hydro has an interest in the property through its involvement in the Norcen exploration program.

Movement of western Canadian bituminous coal by the integrated transportation system began at mid-year 1978 with 550,000 megagrams (610,000 tons) delivered before year-end to the terminal at Thunder Bay.

Total coal deliveries to generating stations from U.S. mines totalled 8,120,000 megagrams (8.96 million tons). The bulk of these deliveries were made under medium to long-term contracts and include coal from the U.S. Steel Cumberland mine. Supplementary spot U.S. coal purchases of 1,400,000 megagrams (1.5 million tons)



High school students study the face of a CANDU nuclear reactor model at the Nuclear Information Center at Pickering Generating Station. During 1978, 40,000 people, many of them students, visited the center which is open seven days a week.

were made to offset the effect of the United Mine Workers' strike in the United States on coal production during the first quarter of the year and to replenish stocks depleted by high levels of electricity exports.

Deliveries of residual oil

totalled 0.508 million cubic metres (3.2 million barrels) for the use at the Lennox Generating Station and Bruce Steam Plant. Deliveries of natural gas were 664 million cubic metres, 48% less than in 1977, and used exclusively at Hearn Generating Station.

Canadians received 75% of Hydro's business

For the second consecutive year, the total value of contract awards increased substantially, reaching a new annual high of \$2.2 billion. This represents a \$800 million increase over 1977 and a \$674 million increase over the previous high established in 1974. The increase is mainly attributable to the award of two contracts for turbine generators for Darlington and Atikokan generating stations totalling approximately \$400 million.

During 1978, outstanding

equipment order commitments increased from \$1.95 billion to \$2.6 billion.

Excluding purchases for fuel, 75.8 per cent of the total value of 1978 purchases was directed to Canadian sources with 91.1 per cent of this business awarded in Ontario. This represents a drop of 9.4 per cent in the value of Canadian awards from the 1977 figures as a result of the impact of the foreign content of the turbine generator awards for Darlington and Atikokan. However, the

Canadian content of these turbine generators was the highest of any offered in the bids considered.

In general, the availability of materials remained excellent, with some improvement in delivery times. There were moderate increases in the costs for domestic goods during 1978, while the decline of the Canadian dollar resulted in significant increases in the cost of foreign products.

Attention focused on alternate energy sources

The research and development programs of Ontario Hydro continued with considerable attention being paid to alternative energy sources.

Studies included the performance of three types of domestic solar water heaters and in monitoring and assessing the performance of solar systems such as the one to be installed in Hydro's new Thermal Training Center in Mississauga. The installation will include solar collectors and heat exchangers and will enable Hydro to monitor the potential of solar power and solar equipment.

Hydro's Energy Conservation and Design and Development Divisions continued monitoring and investigating the potential of windpower and biomass fuel sources. Studies also went ahead towards the recovery of waste heat from generating stations for greenhouse and residential space heating.

Distribution research

In the field of distribution research, projected increases in system voltage levels, higher load densities, and environmental concerns are major activities. Current efforts are focussed on distribution equipment. One phase of this work is being carried out under a Canadian Electrical Association contract and the results will be applicable to all Canadian electrical utilities.

Hydro researchers also sought ways to increase the load capacity of transmission tower footings without having to remove or rebuild them. They also co-operated with the City of Toronto in the "Watts from Waste" program. One of the limiting factors in the Toronto project is the excessively corrosive residue created when refuse is burned.

The Research division also continued the study of the structural and physical properties of rock a thousand feet below ground as the interest in deep, subterranean power stations grows. And experiments got underway to determine if light (either white or colored) will divert fish from cooling water intakes at thermal generating stations. Migrating fish have often forced costly shutdowns of generating units.

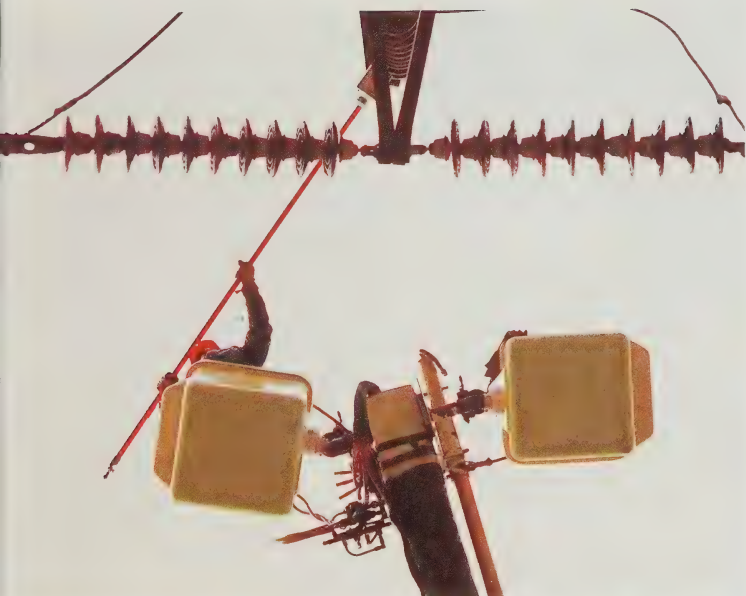


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1/ An engineer uses a watt transducer to measure the effect of stray magnetic fields. 2/ Hot pressurized water in this loop circuit is used for testing equipment associated with the primary heat transport circuits of nuclear reactors. 3/ A lineman uses an insulator tester developed by Ontario Hydro to locate faulty suspension insulators on a transmission line. 4/ A deformation gauge is lowered into a drillhole in rock to measure in-situ stresses. 5/ Torsional movement and stiffness measurements on bundle conductors is part of a research program to control conductor galloping. 6/ A technician on a drill tower connects electrical leads from a borehole deformation gauge. 7/ This equipment provides a petrographic thin section examination to determine the mineralogy of a rock sample. 8/ Researchers measure variations in infra-red radiation intensity from a coal-fired boiler in a search for ways to improve combustion efficiency and safety.



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New transmission lines move the power to market

The construction of approximately 160 circuit kilometres (100 miles) of 500 kV transmission lines from Middleport transformer station to connect to new stations near Milton, Trafalgar and Claireville was completed in 1978. Portions of these lines were placed in service at 230 kV in November. In addition, Trafalgar TS, Hydro's first station with SF₆ gas-insulated metal-enclosed switchgear and bus, was placed in service at 230 kV in November. This technology permits a smaller, more compact structure. The 500 kV stations at Milton and Claireville are still under construction and it is expected that they will be completed and placed in service in 1979.

The 175-kilometre (109-mile) 500 kV line from the Bruce nuclear station to the Milton transformer station was completed as far as Belwood Junction where it has been connected in the existing system and placed in



Aesthetics have improved with this 500 kV transmission tower just north of Oakville.

service at 230 kV. Delays in the completion of the remainder of the 43-kilometre (28-mile) line from Belwood to Milton continued during the year because of legal action by groups opposed to its construction.

Delays caused by current legal actions have resulted in considerable power being locked-in at Bruce, at an estimated cost of

\$1 million to \$3 million a month. The costs are incurred by Hydro having to use imported coal to replace the cheaper, uranium-fueled nuclear power locked in at Bruce.

Expropriation of the right-of-way for the 500 kV line from Lennox GS to Oshawa was completed and construction of this line proceeded. It is expected that the line will be completed early in 1980.

In addition to the 500 kV lines, a number of 230 kV and 115 kV transmission lines were completed during the year involving the construction of approximately 42 circuit kilometres (26 miles) of line.

In terms of major transformer stations, four new stations were placed in service and additional capacity was added at seven existing stations. At the end of the year, construction was in progress on seven new stations and on additions to 15 existing stations.

The public has a say in Hydro planning

During the year Ontario Hydro continued to involve the public and local and provincial governments in its plans to locate routes and sites for either new or upgraded transmission lines and generating station facilities.

This involvement concerned 30 projects, 27 of which were transmission projects that were brought to a successful conclusion following their review and processing under the appropriate applications of the Ontario Environmental Assessment Act.

Several social and community

studies were conducted in support of various planning projects to determine how they might affect neighbouring communities, and what measures could be taken to offset any detrimental effects. Over the past year, these studies were carried out in eight regions of the province.

Project information centres also played an important role in informing the public about specific project details. Over the past year, 24 information centres were well attended by the public.

Two major studies for the

selection of energy centre sites — areas large enough for at least two generating stations and associated transmission facilities — in Eastern Ontario and on Lake Huron's North Channel also proceeded during 1978.

After extensive studies and public hearings by citizens committees, government and Hydro personnel, Ontario Hydro in October, 1978 recommended the acquisition of the Dobie Point/Burton Island site on the North Channel. After similar studies and hearings in Eastern Ontario, site selections were narrowed to two locations — Edwardsburgh and Prescott. A final site selection is expected late in 1979, although Hydro is now considering a smaller site than originally planned.

Interest by the public in Hydro's facilities and technology continued to be demonstrated by the attendance of 700 visitors last year at the Essa Electrical Effects Demonstration Centre near Barrie.

The photo below illustrates a typical public hearing that precedes any application to build new transmission lines and also shows Hydro's concern for full public participation



Pension and Insurance Fund Statement of Assets as at December 31, 1978

	1978	1977
	\$'000	\$'000
Fixed income securities		
Government and government-guaranteed bonds	159,271	130,468
Corporate bonds	131,069	119,565
First mortgages	287,377	248,460
Total fixed income securities	577,717	498,493
Equities — corporate shares	262,404	271,466
Cash and short-term investments	124,295	27,578
Total investments	964,416	797,537
Accrued interest and dividends	11,827	10,488
Receivable from Ontario Hydro	1,786	11,499
	<u>978,029</u>	<u>819,524</u>

Notes

1. The most recent actuarial valuation of the pension plan, at December 31, 1977, reported an unfunded obligation of Ontario Hydro of approximately \$133 million. Of this amount:

- \$87 million, representing accumulated experience deficiencies and deficits resulting from changes in actuarial assumptions, was amortized in 1978 on a five year basis. Commencing on January 1, 1979, it is intended to amortize these deficiencies and deficits on a fifteen year basis; accordingly the remaining balances at December 31, 1978 will be amortized over the years 1979 through 1992. This change will reduce the amortization for 1979 by approximately \$15 million.
- \$46 million, representing an unfunded liability with respect to improved benefits, is being amortized on a fifteen year basis to 1991.

2. In the above statement of assets, bonds are included at amortized cost, first mortgages at balance of principal outstanding and shares at cost. Total bonds and shares at December 31, 1978 with a book value of \$553 million had a market value of \$576 million (1977 book value \$521 million — market value \$510 million).

Auditors' Report

(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1978. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1978.

Toronto, Canada
March 12, 1979

CLARKSON, GORDON & CO.
Chartered Accountants

Superb performances by Pickering, Bruce reactors



Workmen collect reinforcing rods for use in a reactor building dome at Pickering

Ontario Hydro's nuclear generating capability continued to attract world-wide attention during 1978, with the CANDU reactors at Pickering and Bruce stations recording superb performances.

Year end figures show that Hydro's CANDU system reactors registered an average over-all nuclear-electric capacity factor of 81 per cent during 1978, while other systems throughout the world recorded capacity factors ranging from 43 to 65 per cent.

Meanwhile, Hydro's nuclear generation capacity increased measurably during 1978 when the third of the four-unit, 3,200,000 kilowatt Bruce A station came in service in February. The fourth and final unit was declared in service in January 1979. Work on Bruce B is well underway, with the first unit scheduled to be in service by 1983.

At the Pickering B nuclear station, four years of design and construction proceeded on schedule towards a 1981 in-service date for the first of the four, 540,000-kilowatt unit additions. The on-site construction force at the year's end approached 2,000.

Bruce Heavy Water Plant B was virtually complete by the year's

end. However, early in 1979 the prospects of reduced heavy water requirements both domestically and abroad forced a revision in plans for the third plant — Bruce D. The revision saw work stopped on the second half of the plant and the equipment placed in storage for possible later use, while work on the first half will continue until a further review is made later in 1979.

Site preparation and earth excavation work also continued for the four-unit, 3,600,000-kilowatt nuclear station at Darlington.

Fossil Generation

Hydro's thermal generating capacity also increased in 1978 with the addition of two 500,000-kilowatt generators at Nanticoke in September and December. A major program of modifying generator rotors to reduce the risk of rotor cracking was initiated. Three of the seven rotors involved were returned to the manufacturer and are expected to be back in service early in 1979.

Work continued on the two-unit, 300,000-kilowatt extension to Thunder Bay GS, which is scheduled for completion in 1981; and site clearing was completed for

the two-unit, 400,000-kilowatt Atikokan GS.

Based on lower load forecasts, the decision was reached to place two units at Lennox and Units 1 to 4 at R.L. Hearn station into a "frozen reserve" state, starting in early 1979. All four 575,000-kilowatt units at the oil-fired Lennox station will receive routine maintenance; however, operating staff will be retained to operate only two units at any one time. Similarly, the gas-fired, 100,000-kilowatt units 1 to 4 at R.L. Hearn station will be maintained but not staffed for operation. This program, along with similar treatment of J.C. Keith station when it returns to service in 1980, will save more than \$20 million over the next five years.

The lower 1978 load forecast also resulted in the cancellation of two of the four oil-fired units at Wesleyville, and then in February, 1979 the decision was made to place the remainder of the project in storage over the next 12 months. Plans call for the generators and other major equipment to be purchased and stored at the plant, so that the station could be in service about 30 months after the need for it was determined.

Hydraulic Generation

In August, 1978 the Board of Directors gave general approval for the development of a program for the future expansion of the corporation's hydro-electric system which could lead to 17 new projects over the next 16 years.

The 17 projects include 10 new developments plus extensions or redevelopment of present stations. The go-ahead for construction of each project will be made separately. Although the new and extended projects would add an average of only 523,000 kilowatts to Hydro's power production, at an estimated cost of \$1.4 billion, utilization of water power, a proven renewable resource, would record significant savings in fuels and maintenance costs.



Comparative Statistics

	1978	1977	1976	1973	1968
Operating					
Dependable peak capacity ('000 kW)	21,845	21,347	19,677	17,501	10,338
December primary peak demand ('000 kW)	15,722	15,677	15,896	13,606	9,994
Primary energy made available ('000,000 kW.h) ..	95,373	92,855	90,853	78,163	55,789
Customer					
Primary energy sales ('000,000 kW.h)					
Municipalities	61,246*	58,348	57,635	49,340	33,426
Retail	12,901*	13,021	12,436	9,880	6,266
Direct	14,794*	15,187	14,071	14,075	12,252
Total	88,941*	86,556	84,142	73,295	51,944
Secondary energy sales ('000,000 kW.h)	10,393	8,527	4,157	5,564	369
Total Ontario customers ('000)					
Residential	2,410*	2,358	2,297	2,140	1,941
Farm	115*	118	121	124	131
Commercial and industrial	305*	299	292	273	220
Total	2,830*	2,775	2,710	2,537	2,292
Average annual kW.h per customer					
Residential	9,740*	9,724	9,708	8,620	7,128
Farm	18,068*	17,554	16,955	14,332	10,837
Commercial and industrial	202,000*	201,384	198,722	190,600	162,613
Average revenue per kW.h (¢)					
Residential	2.93*	2.80	2.23	1.63	1.29
Farm	3.05*	3.02	2.46	1.87	1.69
Commercial and industrial	2.20*	2.08	1.63	1.13	0.87
Financial					
Bonds and other long-term debt issued (\$'000,000)	1,847	1,407	1,539	535	240
Gross expenditures on fixed assets (\$'000,000) ...	1,694	1,425	1,326	997	329
Revenues (\$'000,000)					
Primary power and energy	1,849***	1,637**	1,320	794	415
Secondary power and energy	289	210	90	62	2
Assets (\$'000,000)	13,163	11,386	9,924	6,343	3,749
Staff, average for year	27,850	25,118	24,123	22,962	19,550

*Preliminary

**after deducting excess revenues of \$122 million

***after deducting excess revenues of \$130 million

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Children's art carries the message

During 1978 Ontario Hydro, in conjunction with 465 elementary schools throughout the province, asked grades five and six students to submit posters in support of its conservation program. This was one of more than 28,000 entries.

It came from 11-year-old Ann Tesluk, a grade six student of St. Jean School in Timmins, and features an imaginative use of felt letters on hopsack.

Ontario Hydro Annual Report/1979

CAZEN
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Ontario Hydro's board of directors view a model of a transmission station designed to operate with SF6 gas-insulated switchgear. The directors are (left to right) William A. Stewart; William E. Raney, Secretary and General Counsel; J. Dean Muncaster; Sister Mary; Arthur J. Bowker, Vice-chairman; Hugh L. Macaulay, Chairman; Douglas J. Gordon, President; Allen T. Lambert; Robert J. Uffen; J. Conrad Lavigne; Alan B. Cousins; and A. Ephraim Diamond. Absent: Philip B. Lind, William Dodge.

Report of the Board of Directors of Ontario Hydro for the year 1979

To The Honourable Robert Welch, Minister of Energy

We, the Board of Directors, submit to you this report of the financial position and relevant Ontario Hydro activities for the year 1979. We would also like to thank you and the staff of the Ministry of Energy for the cooperation and understanding extended during the year.

On behalf of the Board



Hugh L. Macaulay
April, 1980



THE COVER

Ontario Hydro is actively investigating alternative energy sources, such as solar power, in an effort to reduce consumption of conventional electricity. Hydro researcher James Tschirhart tests and evaluates the performance of a commercially-available solar collector installed on the roof of the W. P. Dobson research laboratory on Kipling Avenue, Toronto.



The Chairman comments: an interview with Hugh Macaulay

Q. Why is Ontario Hydro increasing its dependence on nuclear generation?

A. The answer is that we really don't have, at this time, any alternative. Only small-scale hydraulic potential sites are left and these are being explored. The burning of fossil fuels for electrical generation is becoming increasingly uneconomical because of skyrocketing prices. And then there is security of supply: Ontario has no deposits of oil or natural gas and little coal, so uranium is our only large scale alternative. Admittedly the capital costs of nuclear generation are high — and this concerns me greatly — but its fuel is comparatively cheap. Alternative energy sources such as solar, wind and biomass — which, along with the Ministry of Energy, we are investigating actively — seem a long, long way from practical application on a major scale. So when you add it all up, nuclear power will play an increasing role because it's cheaper than fossil fuel, it's relatively pollution free, it has a proved safety record in Ontario, and until something better comes along, that's where the emphasis is going to be.

Q. How do you answer people who say to you, "Is nuclear power safe?"

A. My answer is "yes, it is safe." And I would point out that the government's Select Committee on Hydro Affairs, recognizing the fact that few things in

this world can be proven absolutely safe, concluded after considerable investigation and deliberation that our CANDU reactor is "acceptably safe." However, despite our proven safety record, Ontario Hydro and the federal regulatory authorities are doing everything that is humanly and reasonably possible to enhance that record.

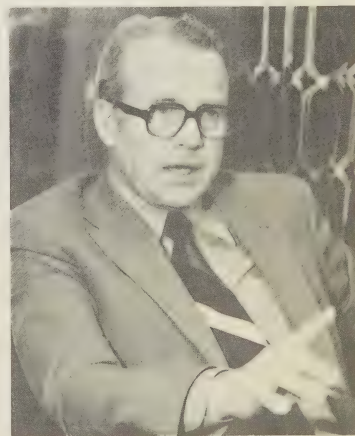
Q. Why are Ontario Hydro's rates increasing and what are the prospects for the future?

A. Because our costs are going up, the same as everybody else's. I'm very hopeful that our rate increases toward the end of the decade may be less than the rate of inflation. But I don't think there's any way that we're inflation-proof. I don't think we can beat the trend of all the costs that are around us. And Hydro's mandate is to provide power at cost, which means our costs are passed along to our customers. The Ontario Energy Board late in 1979 came out with a lengthy report supporting this principle. So as long as costs keep climbing, so must rates.

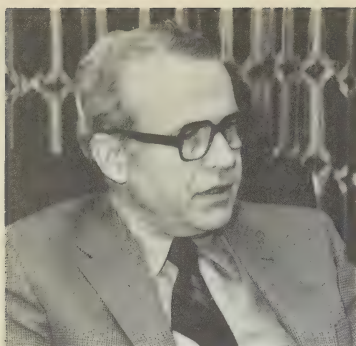
Q. How could Hydro be so far out in its forecasts of our electric needs? Only a few years ago you were forecasting growth of six to seven per cent; now you are down to 3.4 per cent.

A. It has often been said that the only thing forecasters know for sure is that

they are going to be wrong. But forecasting is absolutely necessary because it takes about 14 years to get a power plant from the drawing boards to generating electricity. That means the plants we're bringing on line now were planned in the mid-sixties. And back then who could have predicted the roller-coaster ride ahead with Middle-East oil embargoes,



"The burning of fossil fuels for electrical generation is becoming increasingly uneconomical . . ."



"It is my goal, and a corporate objective, to be completely open with the public."

shocking OPEC price increases, declining economic growth and a falling birth rate? Those are the events that threw forecasts by electrical utilities all over the world out of whack. And it is to those events that we are adjusting now. Fortunately, our forecasts erred on the high side, for as I have pointed out, in this business it takes a long time to catch up.

Q. Since electricity is a manufactured product, why isn't Ontario Hydro aggressively pursuing the sale of export power to the United States?

A. We have sought and are seeking sales of export power to the United States. In 1979 alone our U.S. sales totalled \$345 million, which not only meant a net benefit of \$154 million, but was a major contribution to Canada's balance of payment situation. But you must also realize Hydro only exports interruptible power — power that can be cut off to meet Ontario's needs. So exporting electricity does not threaten our security of supply, and the revenue from the exports helps absorb the costs of power here at home. However, there are environmental considerations, and these must be balanced against the economic benefits to Ontario and Canada.

Q. Ontario Hydro is one of the few utilities in Canada that charges its rural customers more than its urban customers. Can you explain this situation?

A. Hydro is obliged by statute to base its rates on costs — a tenet recently supported by the Ontario Energy Board. Since it generally costs more to distribute electricity in rural areas where densities are lower and distances

greater, those costs are reflected in the higher rates. If the rates were equalized, urban and industrial rates would have to increase or some other form of subsidization would have to be found. Unfortunately, I don't see an immediate solution to this problem, but we are trying to find an answer that may reduce the differential.

Q. Despite the cutbacks and delays in Hydro's expansion program, the number of Hydro employees is increasing. How do you explain this?

A. The expansion program may have been cut back, but electricity demand is still growing, albeit at a reduced rate. So as long as that is the case we'll need more people to provide adequate service. Another factor in our increased numbers is the Board of Directors' determination to be more publicly responsive, to provide for greater public participation in our planning, to provide the various government boards, committees, inquiries and commissions with more complete details and explanations of our activities. This requires more people to handle the workload. However, I have satisfied myself that Hydro is an efficient, well run organization. I can say that because its efficiency was established long before I came along. It's pretty trim and lean, but that doesn't mean trimmer and leaner wouldn't be better.

Q. Some critics claim Ontario Hydro is not responsive to government policy directives and is so big that it's uncontrollable. What is your reaction to that?

A. That is just not so. Hydro is large; we cover a lot of territory and operate widely. Anything that big gives the appearance of being unable to change direction, to respond to changing circumstances. But that is not an accurate reflection of what actually goes on. The Ontario government does have ultimate control of Ontario Hydro. It appoints the Board of Directors and can in that sense make its views effectively felt. And the Board, while sitting as an independent body, does operate within the broad policy framework of government. I think we are getting better at relating to government, and as a matter of fact, both parties are close to agreement on a memorandum of understanding that sets out clearly our responsibilities and inter-relationships.

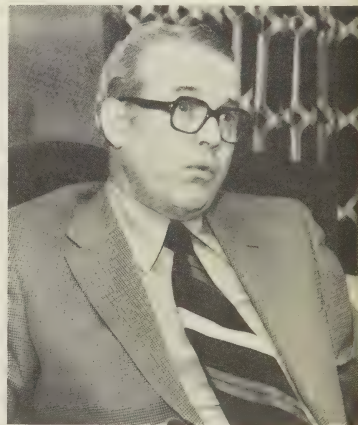
Q. Picking up on the theme of being publicly responsive, hasn't this public involvement created costly delays and

over-complicated the planning process?

A. The simple answer is yes. But as somebody said about our justice system, it may not be perfect but it's the best idea anybody has come up with yet. As you know, the whole climate of our society has changed over the last 10 or 20 years. Everybody wants a bigger part in the decision making process. If we failed to create the means whereby that involvement could be achieved we'd have pressures on our system that would be very serious indeed. But frustrating, time-consuming and expensive as it is, it's an awful lot better than the alternative. Therefore it is my personal goal, and a corporate objective, to be completely open and frank with the public.

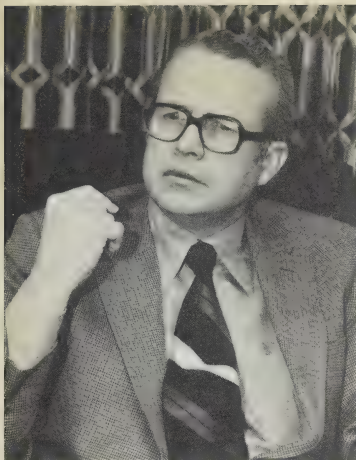
Q. In the past year acid rain has been identified as a major problem of the 1980s. What is Hydro's position?

A. We recognize it as a major national and international problem, a problem that has developed over several decades and that cannot be solved overnight. It concerns not only the burning of fossil fuel for electrical generation but smelting, refining, chemical processing and transportation on both sides of the



"I don't think we can beat the trend of all the costs that are around us."

border. While Hydro has set up a steering committee to study the identification and control of acid gas emissions at our generating stations, it would be improvident to spend millions of dollars only to see a small return on our investment. The Ontario Legislature's Standing Committee on Resources Development has recommended that all existing and planned coal-fired stations be equipped with the



"It's pretty trim and lean, but that doesn't mean trimmer and leaner wouldn't be better."

best technology available to control acid precipitation. We agree, but any Hydro initiatives must be coordinated with federal, provincial and United States authorities if the overall result is to be meaningful.

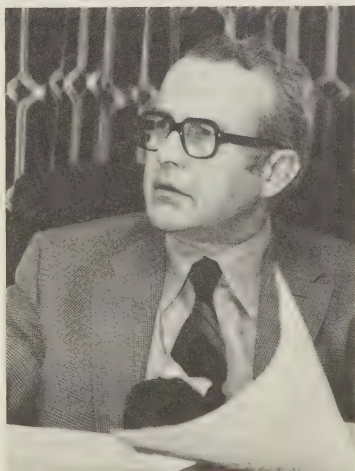
Q. Surely the announced cutbacks in Hydro's generation program augurs badly for the economy of Ontario, especially in our nuclear industry. Shouldn't Hydro be priming the economic pump through continued construction and promoting the sale of power?

A. When Hydro expands its activities and grows with the province's needs there is a beneficial effect, but it's a lock-step process of simultaneous expansion of the economy and Hydro's capacity to meet it. I don't believe Hydro's primary responsibility is promoting economic growth in the province. Hydro is not in the promotion business. Our responsibility is to meet the electric needs of the province and to give the people of Ontario all the facts and all the information at its disposal. On the basis of that information, the people of Ontario will make up their own minds about what they are going to do. And another point: what we've done for some projects — Darlington, for example — is to stretch the construction period. What this means is that the timing of that investment is different. The investment itself isn't disappearing and in that sense it's making just as big a contribution to the economic development of the province, whether it's over a 10-year period or a 12-year period. The only

thing that has changed is the timing.

Q. Looking back on your first year at Ontario Hydro, what are your major impressions?

A. I guess my major impression concerns the people I have met and with whom I work. I know it always sounds trite when a chairman lauds the employees, but Hydro is recognized around the world as one of the most efficient and reliable electric utilities in the business. That reputation was earned, without a doubt, by the efficiency and dedication of Hydro's people. As you know, I was appointed to the Board last year and took over the office of chairman from Robert Taylor in July. He did a lot of the initial spade work following the change from the old electric power commission structure and we are indebted to him for his devoted efforts. Also I would like to pay tribute to Hydro President Doug Gordon, who late in the year announced his intention of taking early retirement in November, 1980. His contributions to Hydro over 35 years of service are beyond measure. I would also like to acknowledge the outstanding services of Robert Hay of Kingston who retired from the Board of Directors this year, and to welcome the new appointees, A. Ephraim Diamond of Toronto and Alan B. Cousins of Wallaceburg. Another group that has impressed me tremendously is the municipalities and their associations, the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities.



"Hydro is recognized as one of the most efficient utilities in the world."

The year was one of challenge for Ontario Hydro

The year 1979 was one of challenge for Ontario Hydro — challenge from an environmentally conscious public, from an economy slowed by inflation and rising interest rates, and from a province determined to reduce its dependency on external energy supply.

While meeting these challenges, Ontario Hydro continued to set records in the production of nuclear and hydraulic power and to meet record demands for electricity from its customers.

Primary energy demand in 1979 was up by 2.9 per cent, compared to 2.7 per cent the previous year. Although this demand represents the highest ever, revised Hydro forecasts issued in January, 1980, indicate Ontario's need for electricity is expected to grow by an average of 3.4 per cent annually to the year 2000. This is down from the 1979 forecast of annual growth of 4.5 per cent.

Generation of electricity by water power was at record highs in 1979, increasing to 38.8 billion kilowatt-hours and providing 35 per cent of the total energy made available. The previous high for hydraulic generation was in 1974, when 37.8 billion kilowatt-hours were produced. The upgrading of generating capacity of Hydro's hydraulic units at Abitibi Canyon, Des Joachims and Robert H. Saunders on the St. Lawrence River was in good part responsible for record production from this renewable resource.

Ontario's other energy resource — uranium — provided another 29 per cent of the total production in the form

of nuclear power. Nuclear generation increased by 11.6 per cent from 1978, displacing thermal generation in terms of total amount of energy generated in one year.

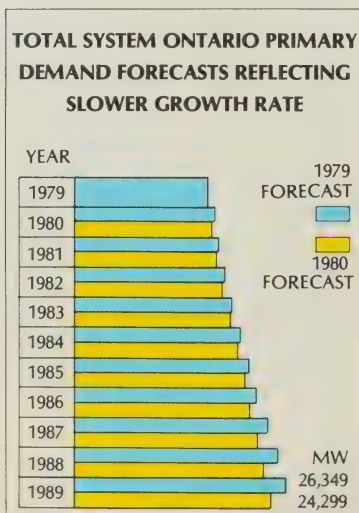
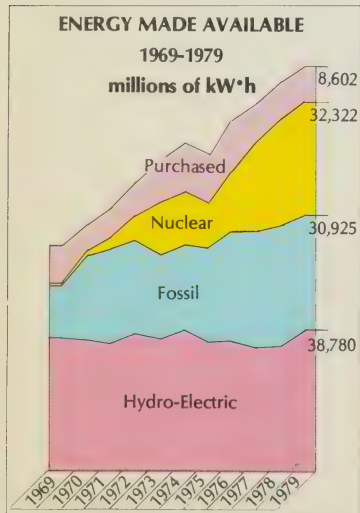
And Hydro's eight nuclear reactors at Pickering and Bruce generating stations continued to rank in the top 36 — four in the top 10 — when compared to the performance of 104 of the world's largest reactors.

Sales again set records

Peak demand set a record on December 17, 1979, reaching 16,365,000 kilowatts. At the time of the peak, dependable peak capacity was 4.5 per cent higher than in 1978 — 23,879,000 kilowatts. The generation mix for dependable peak capacity is made up of 21.1 per cent nuclear, 50.1 per cent thermal, 27.1 per cent hydraulic and 1.7 per cent purchased.

Also during 1979, sparked by the Three Mile Island incident in the United States, the provincial Legislature's Select Committee on Hydro Affairs conducted an extensive examination into the safety of Hydro's CANDU system. After many weeks of testimony and deliberation it concluded Hydro's nuclear reactors are "acceptably safe."

Sales of electrical energy to the United States again set records, increasing from 10.4 billion kilowatt-hours in 1978 to 11.7 billion kilowatt-hours in 1979, a growth of 12.4 per cent. Such sales, valued at \$345 million, yielded an estimated \$154 million in net benefit that is passed on to Ontario consumers.



Don Huston checks for faulty insulators on a transmission line near Guelph with a tester developed by Hydro that can safely be used on a live line.



Energy Made Available: 1979

	1979 Millions of kW·h	1978 Millions of kW·h	% Change Over 1978	% of Total 1979	% of Total 1978
Hydraulic	38,780	35,834	8.2	35.1	33.6
Thermal (coal)	28,540	27,073	5.4	25.8	25.4
Thermal (natural gas)	1,481	2,079	-28.8	1.3	2.0
Thermal (oil)	904	1,739	-48.0	0.8	1.6
Thermal (nuclear)	32,322	28,966	11.6	29.2	27.1
Total generation	102,027	95,691	6.6	92.2	89.7
Purchased*	8,602	11,042	-22.1	7.8	10.3
Total energy made available	110,629	106,733	3.7	100.0	100.0

*Includes non-sale transfers

Almost all of these sales were to neighboring utilities in Michigan and New York. About 30 per cent provided assistance during shortfalls in generating capacity while 70 per cent displaced higher-cost generation by older coal-fired units and those burning oil and gas. In the previous year, 45 per cent of export sales provided assistance in meeting shortfalls.

Generation program

During 1979 and in the early months of this year, the Board of Directors, faced with reduced forecasts of electrical demands to the year 2000, made alterations to Ontario Hydro's long-range construction program.

In matching the expansion program to the 1980 forecast, the Board chose a course of stretching construction periods rather than cancellations. This decision took into account the economics of production, the cost penalties of changing construction schedules, security of supply and the effects on employment. It also considered the fact that even with the reduced forecasts, the estimated peak demand in the year 2000 will be about 31.7 million kilowatts, more than double the peak demand of 15.5 million kilowatts in 1979 for the East System.

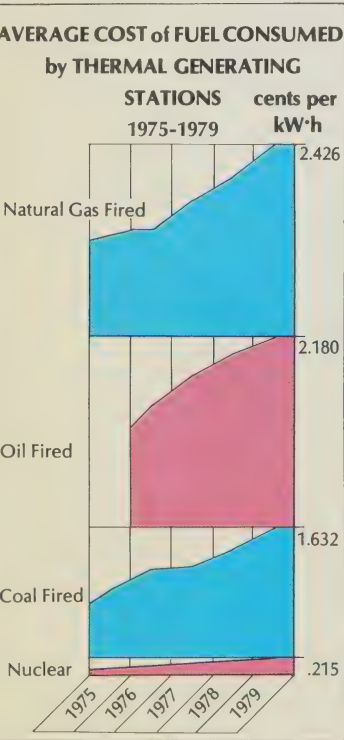
The Board also examined the escalating cost of oil and natural gas and its possible effect on Hydro's load requirements. The price disadvantage electricity had over these fuels is disappearing, particularly for water and space heating.

After considering all these factors, in early 1980 the Board decided to continue construction of the Atikokan thermal station and the Bruce B station and further stretch out the Darlington nuclear station. Earlier in 1979, the Board had decided to halt construction of the second half of the Bruce Heavy Water Plant D and complete the first half, then mothball it until needed, and to stretch out Darlington.

Reviewing the short-term five-year requirements, the Board decided to move four units at the Richard L. Hearn thermal generating station from reserve and mothball them. Availability of two units at Lennox was reduced to 16 hours a day, five days a week, while the two remaining units at this oil-fired generating station remain in frozen reserve. Construction at the oil-fired Wesleyville station was stopped following completion of the powerhouse, and the project was placed in mothball status.

Meanwhile, detailed design work continued in 1979 on the Atikokan thermal generating station. The two-unit 400,000-kilowatt station is

Gizzard shad like the ones held by researcher Dave Lowther of Hydro's chemical research department are notorious for clogging the cooling water intakes at some Hydro plants. Lowther and his colleagues, Paul Patrick and Pat Lowe, are studying fish movements in an effort to solve the problem.





Power was supplied to 2,800,000 customers

scheduled to be in operation in two phases, in 1984 and in 1988. Construction of a 300,000-kilowatt two-unit extension for the Thunder Bay thermal generating station was three-quarters complete by the end of 1979.

Other thermal generation activities in 1979 included an extensive generator modification program at Nanticoke to improve reliability of the eight 500,000-kilowatt units. Also at Nanticoke a coal blending system to achieve a 50/50 mix of coals from Canada and the United States was placed in operation. At the J. Clark Keith station modifications to improve environmental control equipment were completed.

In the nuclear field, construction on the Bruce Heavy Water Plant B was completed early in 1979. The plant has been commissioned and is expected to be in full operation this year. Bruce Heavy Water Plant A produced 599.8 megagrams (661.2 tons) of reactor-grade heavy water in 1979.

A control room simulator for Bruce A nuclear generating station was ordered in 1979, and will provide an invaluable training aid for station personnel. The unit will be a replica of the control room and is wired to computer systems that simulate generating station operations. The computers are able to simulate various nuclear operations, including emergencies, enabling operators to study and practice effective counter-measures.

At Pickering B nuclear station, Ontario Hydro and Babcock & Wilcox (Canada) Ltd. reached an agreement on rebuilding faulty boilers. Estimated costs for rebuilding 34 boilers is \$45 million, with Babcock & Wilcox paying \$35 million.

Babcock & Wilcox boilers were the subject of several weeks of examination by the provincial Legislature's Standing Committee on Resources Development. The committee recommended the posting of performance bonds and pointed out the dangers of dependence on one supplier. Hydro indicated general agreement with the committee recommendations and initiated action as a follow-up to the report.

Customers, Rates and Costs

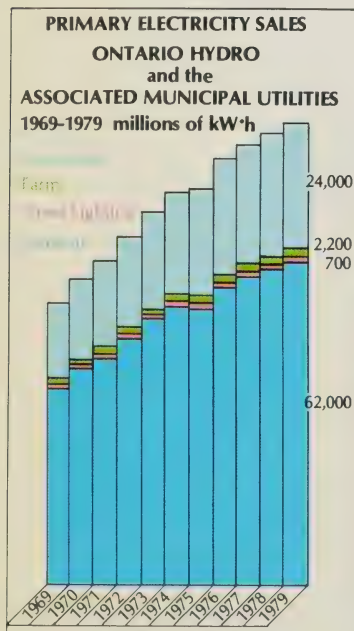
During the year, power was supplied under cost contracts to 332 associated municipal electrical utilities for resale to more than 2,100,000 retail customers. The rural distribution system additionally provided service to 771,000 customers outside the municipal system. At the end of 1979, Ontario Hydro also provided service to 112 direct customers.

As a result of municipal restructuring, about 18,500 Ontario Hydro customers, together with distribution system plants valued at \$11.5 million, were transferred to new utilities in

Land use in the province's vast agricultural areas is an important aspect of Hydro operations. Here gardener Vince Crognale checks plants in his care.



Carpenters such as Roy Bickerstaffe and Garth Stewart (foreground), who work in the Central Services Division, are every bit as large a part of Hydro's team as the corporation's linemen, and head office personnel.





This work received international attention

Vaughan, Richmond Hill and Markham in the Regional Municipality of York. About 1,200 customers, and plant valued at \$850,000, were transferred to the new Welland Hydro-Electric Commission in the Regional Municipality of Niagara.

Increases in wholesale power rates announced in 1979 following public hearings by the Ontario Energy Board were implemented on January 1, 1980. The increases amounted to an average of 8.6 per cent to the municipalities and 7.1 per cent to direct industrial customers. Retail rates to rural customers went up by 6.2 per cent.

A time-of-use rate experiment was begun in 1979, and will continue for several years, to determine the feasibility of customers shifting their power demands to off-peak hours. Some 1,000 customers, residential, industrial and commercial, will be involved.

In 1977 and 1978 Ontario Hydro's revenues exceeded the amount allowed within the spirit and intent of the Anti-Inflation program guidelines by \$252 million. This money, with interest, was applied to reduce customers' bills in 1978 and 1979, limiting the average net wholesale power rate increase to 5.9 per cent a year.

Responding to a recommendation by the Ontario Energy Board, Ontario Hydro began a series of surveys in 1976 to determine the value of electric service to rural, municipal and direct industrial customers. These surveys were completed in 1979. They included large and small industrial customers, residential customers, farms, retail trades and services, government agencies, institutions and office buildings. This work has received international attention and is instrumental in planning an economical level of electric service reliability for the communities Hydro serves.

An important report

Hydro staff is examining the recommendations and background in the costing and pricing report which was released in December by the Ontario Energy Board. It is an important report on a subject which has been under examination for more than two years.

The Hydro Board of Directors, which has the ultimate responsibility to approve any changes to methods of costing and pricing electricity in Ontario, will establish the broad principles within which detailed changes in costing practices and rate

Researcher Bob Goodman checks heat loss with an air leak measurement system.



Lineman Leonard Muegge and a Hydro helicopter — an efficient mix of man and machine — team up to complete a line restringing operation near Chatham.



Hydro continued to stress conservation

structures could be developed.

Ontario Hydro, through advertising, seminars and other information programs, continued to stress energy conservation. Its message stressed, "Use what you need — but need what you use." Major load management test programs are continuing for 1980.

In addition, Ontario Hydro is co-operating with manufacturers of appliances and electric motors and the Canadian Standards Association to develop test methods of performance and reduce energy consumption.

Transmission Systems

During 1979, Ontario Hydro crews completed construction of 61 circuit kilometres (38 circuit miles) of transmission line. The new transformer stations at Milton and Trafalgar are the first in the system to operate with SF6 gas-insulated switchgear on a 500-kilovolt line. This modern equipment allows much more compact design for transformer stations. Property negotiations have resumed for the completion of the 500 kilovolt line between the Bruce generating station and

Milton. It is expected to be operational by mid-1980.

Delays resulting from legal action by groups opposed to transmission line routing, despite approval by the Ontario Municipal Board, resulted in considerable power being locked-in at Bruce at an estimated cost of about \$2 million a month. The costs are incurred by Hydro having to use imported coal to replace the cheaper, uranium-fuelled nuclear power locked in at Bruce, along with high transmission-line losses.

Throughout 1979, considerable work was done on improving and upgrading existing 230-kilovolt transmission lines and stations, particularly in design and construction methods for stringing compact conductors, strengthening existing towers and making design changes to permit increased currents. New standards for grounding fences and buildings near transmission lines were developed.

During the year, more than 1,000 people visited Hydro's Transmission Effects Demonstration Centre near Barrie, the only one of its kind in North America. The centre was designed to demonstrate the electrical and agricultural effects of 500-kilovolt transmission lines in farming communities. Groups from other utilities in Canada and North America, a large number of farm organizations and other interested persons visited the site since it opened in 1976.

In 1979, a number of projects to select routes for new transmission systems — many of them only a few miles in length — and sites for new generating facilities were in progress. Regulatory authorities approved 20 projects for property acquisition and construction.

Recognizing the importance of public participation in such project work, Ontario Hydro actively sought planning participation by the public and all levels of government. The public was also involved in several long-range planning studies and community and social studies.

Valuable information on site and facility selection was contributed by some 20 committees of local citizens throughout Ontario. An integral part of the program was the preparation of informative literature and some 25,000 pieces were distributed. More than 125 staff presentations were made to local councils and groups interested in transmission and generation projects. Information centres were established



Technician Craig Donovan obtains pertinent meteorological data with instruments attached to a balloon as part of Hydro's continuing environmental studies.

Last fall, public meetings were held in the Bowmanville area to inform residents of plans for Hydro's nuclear plant at Darlington and to allow them an opportunity to question a number of senior Hydro officials.



Hydro sought participation by the public

and used to provide local citizens with and opportunity to contribute toward plans that affect their community.

Last summer, Dr. Arthur Porter and his colleagues on the Royal Commission on Electric Power Planning issued reports on the need for additional bulk power facilities in the eastern and southwestern regions of the province. At that time, Ontario Hydro expressed reservations about some aspects of the reports but concurred with the commission's recommendations to strengthen the supply of power to both regions.

Fuel Supplies

During 1979 Ontario Hydro spent \$606 million on fuels for generation, compared to \$487 million in 1978 — an increase in costs of 24 per cent.

Total deliveries of coal from mines in the United States was 9.9 million megagrams (10.9 million tons) during the year. Western Canadian bituminous coal continued to move through the newly developed integrated transportation system and 2.2 million megagrams (2.4 million tons) were delivered, principally to the Nanticoke generating station.

This thermal property analyzer being checked by engineer Tony Griffin uses a microprocessor to determine the backfill requirements for buried cable.



Deliveries of residual oil totalled 0.1 million cubic metres (600,000 barrels) for use at the Lennox generating station and for steam production at the Bruce Heavy Water Plant. Deliveries of natural gas were 461.4 million cubic metres (16.3 billion cubic feet), 43.6 per cent less than in 1978. A total of 711.8 megagrams (785 tons) of uranium was used in 1979 to produce electrical energy and 45.8 megagrams (50 tons) for energy in the form of steam. Delivery of uranium concentrates containing 300 megagrams (331 tons) of uranium was made early in the year under a leasing agreement with Uranium Canada Limited. Development of facilities for production of uranium supplies continued in 1979 under contract with two Elliot Lake producers, Denison Mines Limited and Preston Mines Limited.

Ontario Hydro continued its involvement in uranium exploration programs being carried out by Shell Canada Limited, Amok Limited and Norcen Energy Resources Limited. It has recently become involved with a program being carried out by Canadian Nickel Company Limited.

Purchases

Contract awards by Ontario Hydro during 1979 were valued at \$1.6 billion, a decrease of \$600 million from 1978. During the year, outstanding commitments decreased from \$2.7 billion in 1978 to \$2.6 billion in 1979.

Excluding fuel, value of 1979 purchases directed to Canadian sources was 77.8 per cent of the total. Nearly 90 per cent of this business was awarded in Ontario. This represents an annual rise of 2.1 per cent in Canadian contract awards.

Health and Safety

One occupational fatality in the Ontario Hydro workforce and one in the workforce of an on-site contractor occurred in 1979. Although these numbers are lower than in previous years, improvement will be considered significant only if such performance is measured over several years. The overall disabling injury rate was six per million man-hours and the days lost due to injury were 0.49 per cent of working days.

In October 1979 the Occupational Health and Safety Act, with associated regulations, became law. Ontario Hydro has made effective progress within its various work groups in implementing the statutory requirements.

Geotechnician Philip Milford uses a Winkie drill to investigate the physical condition of an underground water conduit during the regular maintenance shutdown of an Ontario Hydro hydraulic plant at Niagara Falls.



Employee health and safety were emphasized

A high standard of performance in radiological safety was again recorded in 1979 with no occupational or public fatalities or injuries occurring due to exposure to radiation in the nuclear power program. Environmental emissions of radioactivity were generally within the target of one per cent of the Atomic Energy Control Board's approved emission limits.

Development work in the measurement and monitoring of Carbon-14 continued. Sampling and stack monitoring capability was established and an initial Derived Emission Limit was proposed.

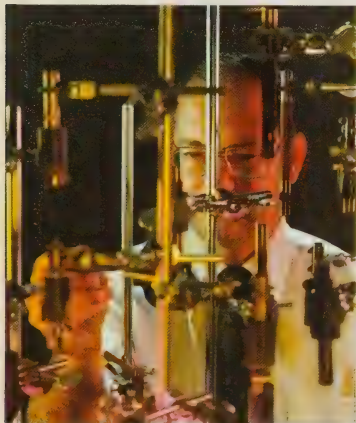
A service was established for measuring PCB concentrations in air and workplaces and workers were monitored in locations where PCBs are handled. Measured concentrations and exposures were a small fraction of established regulatory limits.

Employees

Collective agreements with employees belonging to The Society of Ontario Hydro Management and Professional Staff and the Ontario Hydro Employees' Union were renewed. Increases in wages, averaging 8 per cent during 1979, along with benefits and working conditions, were comparable to those of other major corporations in Ontario.

In 1979, Ontario Hydro employed an average of 28,385 persons. Staff levels across the Hydro organization were frozen in 1979 until work programs for the 1980-84 period were reviewed and approved in early 1980.

Chemical researcher Larry Gibson studies the corrosion effects of faulty boiler water on a steam generator system in a Hydro laboratory.



Research and Development

Research continued into a broad range of environmental and energy utilization problems, together with detailed high-technology research in all aspects of electrical generation.

In the environmental field, scientists and technicians reported progress in the disposal of polychlorinated biphenyls (PCBs), while studies continued into a process for physical and chemical treatment of coal to remove sulphur, ash and trace elements before shipment from the mines.

As part of the Ministry of Energy's alternative energy program, Ontario Hydro will be monitoring and assessing the performance of the solar collectors and heat exchange system to be installed in the corporation's new Thermal Training Centre in Mississauga.

Similar monitoring is going on in an experimental, electrically-heated house built by the Housing and Urban Development Association of Canada. The house utilizes a ventilation system designed and installed by Ontario Hydro which recovers heat from the exhausted air.

The management of radioactive wastes has become a matter of great importance and of major public interest in Canada and other parts of the world. Under the Canada-Ontario agreement, Ontario Hydro is co-operating with Atomic Energy of Canada Limited in studies of techniques for safe, long-term isolation from the environment of radioactive wastes. These included seismic site and rock-dynamics analyses and thermal rock mechanics studies to support AECL's development of proposed nuclear waste repositories in hard rock. Hydro has also been assigned the responsibility for interim storage and developing transportation techniques for nuclear wastes.

Following approval by the Board of Directors, Hydro commenced the second phase of the proposal for a 1,020-megawatt lignite-fuelled generating station at Onakawana in the James Bay lowlands. This phase includes an environmental assessment, fuel contract conditions, basic engineering studies and financial and contractual assessments.

The program for new hydro-electric development made good progress during the year with conceptual engineering activities concluded on 15 of the 17 projects included in the program.

Like most major corporations, Hydro places great emphasis on employee health and fitness. In the photo opposite, Katherine Nakanishi — who works in the nuclear communications centre at Pickering — happily exercises on equipment at the Fitness Centre in the corporation's head office.



The largest electrical utility in Canada

Ontario Hydro is the largest electrical utility in Canada — and second largest in North America. Its operation area extends roughly 1,610 kilometres (1,000 miles) from east to west and covers a quarter-million square miles.

The utility is a special statutory corporation established in 1906 by the Provincial Legislature. It has broad powers to produce, buy and deliver electric power throughout the province. Ontario Hydro operates under The Power Corporation Act, Revised Statutes of Ontario 1970, c. 354 as amended. Hydro is responsible for certain regulatory functions over the

electrical services provided by Ontario's municipalities.

Ontario Hydro is administered by a Board of Directors consisting of a chairman, a vice-chairman, a president and not more than 10 other directors. Regular review of strategy, programs and resources is a function of the Executive Office, composed of the chairman, the president, the two executive vice-presidents and the secretary and general counsel.

The corporation's main responsibility is to provide power to municipalities, which in turn distribute the power to customers in their service

Hydro technicians using high-frequency measurements check the condition of transformer windings in service at the Pickering nuclear generating station.



Research biologists such as Bob Lyons (left) and James Sheldon, who banded and monitored the gull colony near the Bruce Nuclear Power Development, found that the birds' reproductive success is similar to that of gulls in other colonies on the Great Lakes.



Links make Hydro part of a massive grid

areas. In addition, Ontario Hydro supplies more than 100 major direct industrial customers and about 771,000 retail customers either in rural areas or in communities not served by municipal electric utilities.

Seven regional offices and 59 area offices throughout the province ensure efficient operation of Ontario Hydro's vast power network.

Its interconnections with other jurisdictions place the corporation in a massive electrical grid that blankets a large and important segment of the continent. There are links with Manitoba Hydro on the west, Hydro Quebec on the east and with utilities in Michigan and New York states to the south.

Ontario Hydro is a financially self-sustaining corporation that derives no revenue from taxes.

The Power Corporation Act by which Hydro is governed stipulates that power be provided to the municipal customers at cost. The Act defines cost as including charges for power purchases, operation, maintenance, administration, fixed charges and reserve adjustment. Fixed charges include interest, depreciation and the provisions for the retirement of debt over a 40-year period.

The province of Ontario guarantees the payment of the principal and interest on bonds and notes issued to the public by Ontario Hydro. In the case of public borrowing in the United States, the Province borrows on behalf of Hydro by issuing its own debentures and advancing the proceeds to Ontario Hydro upon terms and conditions agreed upon between the Corporation and the Treasurer of Ontario.

Operational audit program instituted in 1979

In April 1979, an Operational Audit Program was initiated using the value-for-money auditing concept to address questions of the economy, efficiency and effectiveness of Ontario Hydro in the conduct of its business.

The program was developed in conjunction with Clarkson Gordon, chartered accountants, who are also

participating with Ontario Hydro staff in carrying it out.

The primary aim of the program is to assist management by providing objective assessments of the functions, systems and activities of Ontario Hydro that are audited with a view to making improvements wherever there are opportunities to do so.

Hydro biologists Edward Checko, Lance Leonard-Barret and Blair Sim take fish samplings near the Bruce Heavy Water Plant. Their catch is then laboratory-analyzed.



A lineman in a cherry-picker is probably the image of Ontario Hydro uppermost in the public mind. Here Claude Haynes assists in a rural restringing job just south of Brampton.



Comparative Statistics

	1979	1978	1977	1974	1969
Operating					
Dependable peak capacity ('000 kW)	23,879	22,845	21,347	15,759	11,242
December primary peak demand ('000 kW) ...	16,365	15,722	15,677	13,538	10,555
Primary energy made available ('000,000 kW•h)	98,127	95,373	92,855	82,696	59,426
Customer					
Primary energy sales ('000,000 kW•h)					
Municipalities	63,342*	61,285	58,348	51,852	36,127
Retail	12,980*	12,927	13,021	10,736	6,921
Direct	15,644*	14,775	15,187	14,829	12,386
Total	91,966*	88,987	86,556	77,417	55,434
Secondary energy sales ('000,000 kW•h)	11,661	10,393	8,527	6,002	1,019
Total Ontario customers ('000)					
Residential	2,461*	2,411	2,358	2,190	1,984
Farm	113*	115	118	124	130
Commercial and industrial	316*	307	299	279	230
Total	2,890*	2,833	2,775	2,593	2,344
Average annual kW•h per customer					
Residential	9,900*	9,797	9,724	8,971	7,417
Farm	19,300*	18,279	17,554	15,300	11,668
Commercial and industrial	200,700*	200,601	201,384	195,322	165,675
Average revenue per kW•h (¢)					
Residential	3.16*	2.98	2.80	1.74	1.34
Farm	3.42*	3.21	3.02	2.06	1.78
Commercial and industrial	2.30*	2.17	2.08	1.21	0.90
Financial					
Bonds and other long-term debt issued (\$'000,000)	1,405	1,847	1,407	700	399
Gross expenditures on fixed assets (\$'000,000) .	1,659	1,694	1,425	890	447
Revenues (\$'000,000)					
Primary power and energy	2,222	1,849***	1,637**	896	469
Secondary power and energy	346	289	210	102	7
Assets (\$'000,000)	14,514	13,163	11,386	7,080	4,129
Staff, average for year	28,385	27,850	25,118	23,612	21,686

*Preliminary

**after deducting excess revenues of \$122 million

***after deducting excess revenues of \$130 million

Financial Review

Ontario Hydro's 1979 financial results showed an overall improvement and, for the first time since 1966, the Corporation's debt-equity ratio improved in comparison to the previous year. Net income amounted to \$268 million in 1979, an increase of \$120 million over 1978. However, 1979 results did not include two non-recurring items which reduced 1978 net income by \$151 million — an allowance of \$130 million for excess revenues payable to customers within the spirit and intent of the Anti-Inflation program; and an extraordinary charge of \$21 million which arose from the cancellation of two of the four oil-fuelled generating units under construction at Wesleyville.

Total 1979 revenues were \$2,568 million. Revenues from sales of primary power and energy in 1979 amounted to \$2,221 million, an increase of 12% over the previous year. This increase of \$242 million was primarily due to the 9.5% increase in bulk power rates and, to a lesser extent, increased volume of sales. In 1979 the total primary delivered load increased by 2.0% and delivered energy by 3.3% over 1978. Revenues from sales of secondary power and energy amounted to \$347 million in 1979, \$58 million or 20% higher than in 1978. This higher level of secondary revenues, resulting mainly from increased export sales to U.S. utilities, produced approximately \$155 million of net revenue for the Corporation.

Costs, excluding financing charges and extraordinary item, totalled \$1,646 million in 1979 compared to \$1,421 million in 1978, an increase of 16%. Operation, maintenance and administration costs were \$602 million in 1979, an increase of \$100 million or 20% over 1978. This increase resulted mainly from the escalation of labour and material costs, certain planning and development costs previously capitalized being charged to operations in 1979, and the costs of operating and maintaining new plants placed in service. The cost of fuel used for electric generation increased by \$119 million to \$606 million in 1979 reflecting a 6% increase in the volume of electricity generated by thermal stations and a 17% increase in the average unit cost of fuels burned. Payments required under the nuclear agreement payback increased by \$6 million in 1979. Charges for energy produced by generating units during commissioning decreased by \$19 million to only \$3 million in 1979 as a result of the reduced level of commissioning activity. Depreciation costs rose \$20 million in 1979 to \$285 million, mainly as the result of new units being in service throughout 1979 at the Nanticoke and Bruce "A" generating stations, and additional transformation and transmission facilities being placed in service.

Interest and foreign exchange costs charged to operations totalled \$654 million in 1979, \$105 million or 19% higher than 1978. Interest costs increased by \$63 million or 12% over 1978, reflecting financing costs associated with new plants in service, construction projects deferred during 1979, and new borrowings at higher interest rates. Foreign exchange costs totalled \$71 million in 1979, an increase of \$42 million over 1978 mainly resulting from the increased cost of retiring foreign debt at current rates of exchange.

The amount of net income appropriated for debt retirement, as required by The Power Corporation Act, increased by \$13

million in 1979 to \$126 million. The remaining \$142 million balance of 1979 net income was appropriated for stabilization of rates and contingencies compared to \$34 million in 1978.

The overall financial position of the Corporation, as reflected by the debt-equity and interest coverage ratios improved during 1979 and was mainly attributable to the higher level of net income.

Financial Ratios	1979	1978
Debt Equity	.848	.853
Interest Coverage	1.26	1.19

In 1979 the major application of funds was for the construction of new plant and facilities. Net additions to fixed assets were \$1,575 million, comprised of \$1,038 million for generation facilities, \$258 million for transmission and distribution facilities, \$184 million for heavy water plants, and \$122 million for the production of heavy water. Net additions were \$77 million lower than those in 1978 mainly the result of proceeds of \$103 million on sales of heavy water in 1979. The expenditures during 1978 and 1979 on major generation facilities under construction were:

Major Generation Facilities Under Construction	1979 Expenditures \$ million	1978 Expenditures \$ million
Nuclear Generating Stations		
Bruce "B"	386	144
Pickering "B"	326	276
Darlington	56	36
Fossil Generating Stations		
Thunder Bay	124	101
Atikokan	25	16

Other 1979 application of funds represent increases in fuel, materials and supplies of \$188 million, increases in advance payments for fuel supplies of \$127 million, and \$130 million for excess revenues rebated to customers within the spirit and intent of the Anti-Inflation program.

Funds provided from operations in 1979 amounted to \$552 million while net financing provided \$1,430 million. Compared to 1978, these amounts increased by \$119 million and \$195 million respectively. In addition, increases in accounts payable and accrued interest amounted to \$102 million in 1979.

Proceeds from the issue of long-term bonds, notes and other long-term debt during 1979 totalled \$1,405 million. Canadian currency issues of \$600 million, issues in United States currency of \$600 million (Canadian \$706 million), and a floating rate bank loan of 68 million Swiss francs (Canadian \$48 million) were floated during 1979. Additional long-term debt financing was provided by leases of capital equipment valued at \$13 million and a borrowing arrangement for the acquisition of uranium valued at \$38 million. Retirement of long-term debt during the year amounted to \$288 million. The average coupon interest rate of bond issues in 1979 was 9.9%, as compared to an average rate of 9.3% in 1978. In addition, the level of cash and investments decreased by \$318 million during 1979.

Auditors' Report

We have examined the statement of financial position of Ontario Hydro as at December 31, 1979 and the statements of operations, reserve for stabilization of rates and contingencies, equities accumulated through debt retirement appropriations and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

As explained in note 6, Bruce Heavy Water Plant "D" and the Wesleyville Generating Station, which have an unamortized cost of \$656 million at December 31, 1979, have been deferred and it is not known when these assets will be used.

In our opinion, subject to the effect, if any, on the

financial statements of the ultimate resolution of the uncertainty discussed in the preceding paragraph, these financial statements present fairly the financial position of Ontario Hydro as at December 31, 1979 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles. Further in our opinion, except for the changes in accounting policies described in the summary of significant accounting policies and in note 14 to the financial statements, such accounting principles have been applied on a basis consistent with that of the preceding year.

Toronto, Canada
March 10, 1980

CLARKSON GORDON
Chartered Accountants

Summary of Significant Accounting Policies

The accompanying financial statements have been prepared by management in accordance with accounting principles generally accepted in Canada, applied on a consistent basis except for the changes described under "Depreciation", "Advance payments for fuel supplies", "Fuel for electric generation", "Pension plan" and "Research and development". In management's opinion, the financial statements have been properly prepared within reasonable limits of materiality and in the light of information available up to March 10, 1980. To assist the reader in understanding the financial statements, the Corporation's significant accounting policies are summarized below:

Fixed assets

Fixed assets are capitalized at cost which is comprised of material, labour and engineering costs, plus overheads and interest applicable to the capital construction program. In the case of generation facilities, cost also includes the net cost of commissioning, and for nuclear generation, the cost of heavy water. The net cost of commissioning is the cost of start-up less the value attributed to energy produced by units during their commissioning period. The cost of heavy water is the direct cost of production and applicable overheads, plus interest and depreciation on the heavy water production facilities. Leases which transfer the benefits and risks of ownership of assets to Ontario Hydro are capitalized.

Interest is capitalized on construction in progress at rates which approximate the average cost of long-term funds borrowed in the years in which expenditures have been made for fixed assets under construction. The effective annual rates were 10% in 1979 and 9.9% in 1978.

If it is decided to significantly extend the construction period of a project, interest is not capitalized on construction during the period of extension. If a project is deferred after construction has started, mothballing costs associated with the deferment are charged to operations. Interest is not capitalized on deferred projects during the period of their deferral. If a project is cancelled, all costs, including the costs of cancellation, are written off to operations.

Depreciation

In 1979, all fixed assets in service, except land, are depreciated on a straight-line estimated service life basis. Prior to 1979, all fixed assets were depreciated on a straight-line basis, except for hydraulic generation, transmission, distribution and administration assets placed in service before January 1, 1971, which were depreciated on a sinking fund basis. The straight-line method was adopted effective January 1, 1979 for those assets previously depreciated on a sinking fund basis.

Depreciation rates for the various classes of assets are based on their estimated service lives, which are subject to periodic review. Any changes in service life estimates are implemented on a remaining service life basis. Effective January 1, 1979, the estimated service lives of certain transmission and distribution assets, and the service life of heavy water, were revised.

The estimated service lives of assets in the major classes are:

Generation — hydraulic	— 50 to 100 years
— fossil and nuclear	— 30 years
Heavy water	— over the period ending in the year 2030 (1978 — 30 years)
Transmission and distribution	— 25 to 55 years (1978 — 25 to 50 years)
Administration and service	— 5 to 60 years
Heavy water production facilities	— 20 years)

In accordance with the group depreciation practices of the utility industry, for normal retirements the cost of fixed assets retired is charged to accumulated depreciation with no gain or loss being reflected in operations. However, gains and losses on sales of fixed assets, losses on premature retirements, and the costs of removal less salvage proceeds on all retirements, are reflected as adjustments to depreciation expense in the year incurred.

The costs of deferred projects are amortized so that any estimated loss in value is charged to operations on a straight-line basis over the expected deferral period. The annual amortization rates, which are subject to periodic review, are 2.5% for Bruce Heavy Water Plant "D" and 1.67% for the Wesleyville Generating Station.

Advance payments for fuel supplies

As part of its program to ensure the adequate supply of fuels for its generating stations, Ontario Hydro has entered into long-term contracts for the supply of coal, oil and uranium. Where these contracts require Ontario Hydro to make payments to suppliers in advance of product delivery for pre-production costs, these payments and associated costs, including interest, are carried in the accounts as advance payments for fuel supplies. The advance payments are amortized to fuel inventory as the fuels are delivered under the contracts.

Interest is capitalized as part of advance payments and is charged to fuel inventory as the fuels are delivered. In prior years, interest on advance payments was charged to operations as interest expense as soon as the first delivery of fuel under the contracts had commenced.

Fuel for electric generation

The cost of fuel for electric generation is comprised of fuel purchases, transportation and handling costs, and the amortization of advance payments for fuel supplies. The cost of borrowed fuel is the discounted present value of both lease payments and estimated future replacement costs. Transportation costs include interest and depreciation on railway equipment owned by Ontario Hydro. Prior to 1979, interest on railway equipment was charged to operations as interest expense. Fuel used for electric generation is charged to operations on the average cost basis.

Nuclear agreement — Pickering units 1 and 2

Ontario Hydro, Atomic Energy of Canada Limited and the Province of Ontario are parties to a joint undertaking for the construction and operation of units 1 and 2 of Pickering Nuclear Generating Station, with ownership of these units being vested in Ontario Hydro. Contributions to the capital cost by Atomic Energy of Canada Limited and the Province of Ontario amounted to \$258 million and these have been deducted in arriving at the value of fixed assets in service in respect of Pickering units 1 and 2. Ontario Hydro is required to make monthly payments until the year 2001 to each of the parties in proportion to their capital contributions. These payments, termed "payback", represent in a broad sense the net operational advantage of having the power generated by Pickering units 1 and 2 as compared with coal-fired units similar to Lambton units 1 and 2.

Commissioning energy

Revenues from the sale of power and energy include revenues from energy produced by generating units during the commissioning period. A charge is included in the cost of operations for the value attributed to the energy produced during the commissioning period. This charge is equivalent to the operating and fuel costs of producing the same quantity of energy at generating units displaced because of the commissioning activity.

Appropriations from net income

Under the provisions of The Power Corporation Act, the price payable by customers for power is the cost of supplying the power. Such cost is defined in the Act to include the cost of operating and maintaining the system, depreciation, interest, and the amounts appropriated for debt retirement and stabilization of rates and contingencies.

The debt retirement appropriation is the amount required under the Act to accumulate in 40 years a sum equal to the debt incurred for the cost of the fixed assets in service. The appropriation for or withdrawal from the stabilization of rates and contingencies reserve is an amount established to maintain a sound financial position and to stabilize the effect of cost fluctuations.

Foreign currency translation

Long-term debt payable in foreign currencies is translated to Canadian currency at rates of exchange at the time of issue. Current monetary assets and liabilities, including long-term debt payable within one year, are adjusted to Canadian currency at year-end rates of exchange. The resulting

translation gains or losses, together with realized exchange gains or losses, are credited or charged to operations.

Pension plan

The pension plan is a contributory, defined benefit plan covering all regular employees of Ontario Hydro. The pension costs for each period, as actuarially determined, include current service costs and amounts required to amortize any unfunded liability. Commencing January 1, 1979 all unfunded liabilities are being amortized over a fifteen year period. Prior to 1979, those arising from changes in actuarial assumptions or from experience deficiencies were being amortized on a five year basis.

Research and development

Research and development costs are charged to operations in the year incurred, except for those related directly to the design or construction of a specific capital facility. Prior to 1979, certain development costs and expenditures related to the overall planning of the power system had been capitalized. These costs are being amortized over a 10 year period.

Statement of Operations
for the year ended December 31, 1979

	<u>1979</u>	<u>1978</u>
	\$'000	\$'000
Revenues		
Primary power and energy		
Municipal utilities	1,441,557	1,275,107
Retail customers	474,795	442,224
Direct customers	305,210	261,816
	<u>2,221,562</u>	<u>1,979,147</u>
Secondary power and energy	346,558	288,533
	<u>2,568,120</u>	<u>2,267,680</u>
Less excess revenues (note 1)	—	130,292
	<u>2,568,120</u>	<u>2,137,388</u>
Costs		
Operation, maintenance and administration	601,422	501,800
Fuel used for electric generation	605,839	487,037
Power purchased	98,456	97,949
Nuclear agreement — payback	53,195	46,936
Commissioning energy	2,776	21,866
Depreciation (note 2)	284,610	265,060
	<u>1,646,298</u>	<u>1,420,648</u>
Income before financing charges and extraordinary item	<u>921,822</u>	<u>716,740</u>
Interest (note 3)	583,332	519,449
Foreign exchange (note 4)	70,875	29,346
	<u>654,207</u>	<u>548,795</u>
Income before extraordinary item	267,615	167,945
Extraordinary item (note 6)	—	20,500
Net income	<u>267,615</u>	<u>147,445</u>
Appropriation for:		
Debt retirement as required by		
The Power Corporation Act	125,932	113,446
Stabilization of rates and contingencies	141,683	33,999
	<u>267,615</u>	<u>147,445</u>

See accompanying summary of significant accounting policies and notes to financial statements

**Statement of Financial Position
as at December 31, 1979**

Assets	1979	1978
	\$'000	\$'000
Fixed assets		
Fixed assets in service (note 5)	10,441,984	9,549,008
Less accumulated depreciation	<u>2,147,326</u>	<u>1,859,391</u>
	8,294,658	7,689,617
Construction in progress (note 5)	3,674,929	3,526,802
Deferred construction projects (note 6)	<u>659,255</u>	<u>124,542</u>
	<u>12,628,842</u>	<u>11,340,961</u>
 Current assets		
Cash and short-term investments (note 7)	381,102	692,884
Accounts receivable	292,643	254,785
Fuel for electric generation (note 8)	579,209	409,781
Materials and supplies, at cost	<u>132,905</u>	<u>112,129</u>
	<u>1,385,859</u>	<u>1,469,579</u>
 Other assets		
Advance payments for fuel supplies (note 9)	267,383	140,703
Long-term investments (note 10)	53,426	59,555
Unamortized debt discount and expense	117,567	105,635
Long-term accounts receivable and other assets	<u>60,652</u>	<u>46,073</u>
	<u>499,028</u>	<u>351,966</u>
	<u>14,513,729</u>	<u>13,162,506</u>

See accompanying summary of significant
accounting policies and notes to financial statements.

Liabilities	1979	1978
	\$'000	\$'000
Long-term debt		
Bonds and notes payable (note 11)	11,206,395	10,129,119
Other long-term debt (note 12)	309,330	269,556
	<u>11,515,725</u>	<u>10,398,675</u>
Less payable within one year	381,540	171,912
	<u>11,134,185</u>	<u>10,226,763</u>

Current liabilities

Accounts payable and accrued charges	615,416	529,500
Short-term notes payable	20,070	25,415
Accrued interest	289,941	273,579
Long-term debt payable within one year	381,540	171,912
Excess revenues payable (note 1)	3,039	132,544
	<u>1,310,006</u>	<u>1,132,950</u>

Equity

Equities accumulated through debt retirement appropriations ..	1,516,026	1,391,181
Reserve for stabilization of rates and contingencies	426,817	284,917
Contributions from the Province of Ontario as assistance for rural construction	126,695	126,695
	<u>2,069,538</u>	<u>1,802,793</u>
	<u>14,513,729</u>	<u>13,162,506</u>

On behalf of the Board

George A. Maclean

J. Gordon

Chairman

President

Toronto, Canada
March 10, 1980

**Equities Accumulated through
Debt Retirement Appropriations
for the year ended December 31, 1979**

	Municipalities	Power District (Retail and Direct Customers)	Totals	
			1979	1978
	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	967,921	423,260	1,391,181	1,279,667
Add:				
Debt retirement appropriation	85,059	40,873	125,932	113,446
Annexation transfers and refunds	5,631	(6,718)	(1,087)	(1,932)
Balances at end of year	<u>1,058,611</u>	<u>457,415</u>	<u>1,516,026</u>	<u>1,391,181</u>

**Reserve for Stabilization
of Rates and Contingencies
for the year ended December 31, 1979**

	Held for the benefit of all customers	Held for the benefit of (or recoverable from) certain groups of customers			Totals	
		Municipalities	Retail Customers	Direct Customers	1979	1978
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Balances at beginning of year	319,909	1,144	(32,561)	(3,575)	284,917	250,401
Appropriation	130,354	109	8,012	3,208	141,683	33,999
Deficit recovered from municipalities on annexations	(73)	—	399	—	326	621
Payment to Ontario Municipal Electric Association (note 13)	—	(109)	—	—	(109)	(104)
Balances at end of year	<u>450,190</u>	<u>1,144</u>	<u>(24,150)</u>	<u>(367)</u>	<u>426,817</u>	<u>284,917</u>

See accompanying summary of significant accounting policies and notes to financial statements.

**Statement of Changes in
Financial Position
for the year ended December 31, 1979**

	<u>1979</u>	<u>1978</u>
	<u>\$'000</u>	<u>\$'000</u>
Source of Funds		
Operations		
Income before extraordinary item	267,615	167,945
Depreciation, a charge not requiring funds in the current year	<u>284,610</u>	<u>265,060</u>
	552,225	<u>433,005</u>
Financing		
Long-term debt		
Bonds; notes and other long-term debt issued ..	1,404,844	1,846,530
Less retirements	<u>287,794</u>	<u>356,618</u>
	1,117,050	<u>1,489,912</u>
Short-term notes payable — (decrease)	(5,345)	(19,520)
Cash and investments — decrease (increase) ...	<u>317,911</u>	<u>(235,843)</u>
	1,429,616	<u>1,234,549</u>
Increase in accounts payable and accrued interest	<u>102,278</u>	<u>149,998</u>
	<u>2,084,119</u>	<u>1,817,552</u>
Application of Funds		
Net additions to fixed assets (note 16)	1,574,716	1,652,043
Increase in fuel, materials and supplies	187,979	65,137
Increase in advance payments for fuel supplies	126,680	45,626
Decrease (increase) in excess revenues payable (note 1)	129,505	(10,451)
Increase in accounts receivable and other assets	65,239	44,697
Extraordinary item (note 6)	<u>—</u>	<u>20,500</u>
	<u>2,084,119</u>	<u>1,817,552</u>

See accompanying summary of significant
accounting policies and notes to financial statements.

Notes to Financial Statements

1. Anti-Inflation program

Ontario hydro was required by the Province of Ontario to conform with the spirit and intent of the Federal Anti-Inflation program as it applied to net income for the years 1977 and 1978. The excess revenues payable at December 31, 1978, together with interest, are being applied to reduce customers' bills in 1979 and 1980.

2. Depreciation

	1979	1978
	\$'000	\$'000
Depreciation of fixed assets in service	326,070	294,316
Amortization of deferred construction projects	8,156	702
Costs of removal less salvage proceeds on retirements	3,894	3,021
	<u>338,120</u>	<u>298,039</u>
Less:		
Depreciation charged to heavy water production	22,269	16,236
Depreciation capitalized as construction in progress	16,435	13,497
Depreciation charged to fuel for electric generation	2,225	490
Net gains on sales of fixed assets	12,581	2,756
	<u>53,510</u>	<u>32,979</u>
	<u>284,610</u>	<u>265,060</u>

3. Interest

	1979	1978
	\$'000	\$'000
Interest on bonds, notes, and other debt	1,029,568	899,817
Less:		
Interest charged to — construction in progress	282,213	272,649
— heavy water production	35,865	26,122
— advance payments for fuel supplies	18,295	5,348
— fuel for electric generation	4,700	—
Interest earned on short-term and long-term investments	89,459	70,457
Net gain on redemption of bonds and sale of investments	15,704	5,792
	<u>446,236</u>	<u>380,368</u>
	<u>583,332</u>	<u>519,449</u>

4. Foreign exchange

	1979	1978
	\$'000	\$'000
Exchange loss on refinancing of foreign long-term debt	33,281	48,278
Exchange loss on redemption and translation of foreign long-term debt	30,052	18,338
Net exchange loss (gain) on other foreign transactions	7,542	(37,270)
	<u>70,875</u>	<u>29,346</u>

5. Fixed assets

	1979			1978		
	Assets in Service	Accumulated Depreciation	Construction in Progress	Assets in Service	Accumulated Depreciation	Construction in Progress
Generation — hydraulic ...	1,729,400	360,153	8,976	1,717,361	330,071	8,915
— fossil	2,231,864	556,224	377,204	2,189,857	481,504	421,833
— nuclear	1,878,802	183,467	1,930,619	1,507,317	117,110	1,513,130
Heavy water	589,484	56,227	110,632	479,455	45,871	193,263
Transmission and distribution	3,063,815	722,375	456,491	2,851,931	667,176	378,212
Administration and service .	502,776	170,882	8,098	434,735	143,444	36,780
Heavy water production facilities	445,843	97,998	782,909	368,352	74,215	974,669
	<u>10,441,984</u>	<u>2,147,326</u>	<u>3,674,929</u>	<u>9,549,008</u>	<u>1,859,391</u>	<u>3,526,802</u>

Construction in progress at December 31, 1978 included \$192 million for the fossil-fired Wesleyville Generating Station and \$200 million for Bruce Heavy Water Plant "D" which were transferred to deferred construction projects in 1979 (see note 6). Construction in progress at December 31, 1979 is comprised of:

	Planned In-Service Dates	Generating Capacity to be Installed	Costs Incurred to December 31, 1979	Estimated Future Costs to Complete (Including Escalation)
Nuclear generating stations (including heavy water)		MW	\$ millions	\$ millions
Pickering "B"	1982-84	2,160	1,253	1,620
Bruce "B"	1983-87	3,200	623	3,540
Darlington	1988-91	3,600	118	7,000
Fossil generating stations				
Thunder Bay	1981	300	295	110
Atikokan	1984-88	400	48	810
Bruce Heavy Water Plant "B"	1980	—	781	70
All other construction in progress	—	—	557	—
			<u>3,675</u>	

The above estimates are the most recent forecasts as of March 10, 1980. Because of long construction lead times on these projects, the assumptions underlying these forecasts are subject to change which may affect the planned in-service dates and estimated future costs to complete.

6. Deferred construction projects

	1979			1978		
	Capital Cost	\$'000 Accumulated Amortization	Unamortized Cost	Capital Cost	\$'000 Accumulated Amortization	Unamortized Cost
Bruce Heavy Water Plant "D"	419,013	3,850	415,163	120,000	—	120,000
Wesleyville Generating Station	244,520	3,733	240,787	—	—	—
	663,533	7,583	655,950	120,000	—	120,000
Minor projects	5,941	2,636	3,305	6,605	2,063	4,542
	<u>669,474</u>	<u>10,219</u>	<u>659,255</u>	<u>126,605</u>	<u>2,063</u>	<u>124,542</u>

As a result of significantly reduced load forecasts in 1978 and 1979, the Board of Directors made the following revisions to the capital construction program:

Bruce Heavy Water Plant "D".

In 1978, it was decided to stop construction on the second half of the plant and store the components. In 1979 it was decided to complete construction and then mothball the first half of the plant. It is uncertain at this time when the plant will be used.

Wesleyville Generating Station.

In 1978, units 1 and 2 were cancelled and associated costs of \$20.5 million were written off as an extraordinary charge against income. In 1979, it was decided to stop construction on units 3 and 4 and store the components until the early 1990's.

Mothballing costs associated with the above deferrals amounting to \$20 million were charged to operations in 1979 (1978 — \$15 million).

7. Cash and short-term investments

	1979	1978
	\$'000	\$'000
Cash and interest bearing deposits with banks and trust companies	276,366	595,929
Corporate bonds and notes	85,628	77,074
Government and government-guaranteed bonds	19,108	19,881
	<u>381,102</u>	<u>692,884</u>

Cash and short-term investments are recorded at cost which approximates market value.

8. Fuel for electric generation

	1979	1978
	\$'000	\$'000
Coal inventories	460,115	319,027
Uranium inventories	87,903	52,203
Oil inventories	31,191	38,551
	<u>579,209</u>	<u>409,781</u>

9. Advance payments for fuel supplies

	1979	1978
	\$'000	\$'000
Coal supply	89,694	69,181
Uranium supply	177,689	71,522
	<u>267,383</u>	<u>140,703</u>

Based on present commitments, additional advance payments for fuel supplies, excluding interest, will total approximately \$424 million over the next five years (including approximately \$147 million in 1980).

10. Long-term investments

	1979	1978
	\$'000	\$'000
Government and government-guaranteed bonds	53,426	59,555

Long-term investments are recorded at amortized cost. Their market value at December 31, 1979 was \$38 million (1978 — \$46 million).

11. Bonds and notes payable

Bonds and notes payable, expressed in Canadian dollars, are summarized by years of maturity and by the currency in which they are payable in the following table:

1979				1978		
Years of maturity	Principal Outstanding \$'000	Weighted Average Coupon Rate	Principal Outstanding \$'000	Weighted Average Coupon Rate		
	Canadian	Foreign	Total		Total	
1979	—	—	—		161,348	
1980	113,050	251,867	364,917		340,106	
1981	238,068	90,406	328,474		332,541	
1982	206,434	227,507	433,941		390,221	
1983	171,756	203,443	375,199		379,267	
1984	99,130	115,633	214,763		—	
1 - 5 years	828,438	888,856	1,717,294	7.1%	1,603,483	7.2%
6 - 10 years	303,448	712,798	1,016,246	7.8	1,142,355	7.5
11 - 15 years	301,796	238,872	540,668	7.9	471,255	7.6
16 - 20 years	1,094,750	521,259	1,616,009	8.2	1,410,356	8.0
21 - 25 years	1,632,803	757,747	2,390,550	9.4	1,836,230	9.3
26 - 30 years	1,395,971	2,529,657	3,925,628	9.4	3,665,440	9.2
	<u>5,557,206</u>	<u>5,649,189</u>	<u>11,206,395</u>		<u>10,129,119</u>	
<u>Currency in which payable</u>						
Canadian dollars		5,557,206			5,162,889	
United States dollars		5,338,998			4,679,236	
West German Deutsche marks		95,911			124,055	
Swiss francs		214,280			162,939	
		<u>11,206,395</u>			<u>10,129,119</u>	

Bonds and notes payable in United States dollars include \$4,072 million (1978 — \$3,420 million) of Ontario Hydro bonds held by the Province of Ontario and having terms identical with Province of Ontario issues sold in the United States on behalf of Ontario Hydro. Except for these issues and a note of \$109 million payable in Swiss francs, all bonds and notes payable are guaranteed as to principal and interest by the Province of Ontario.

Long-term bonds and notes payable in foreign currencies are translated into Canadian currency at rates of exchange at time of issue. If Ontario Hydro were to translate the face value of its foreign bonds and notes payable at year-end rates of exchange, the total amount of these liabilities would have to be increased by \$730 million at December 31, 1979 (1978 — \$873 million).

12. Other long-term debt

	1979	1978
	\$'000	\$'000
The balance due to Atomic Energy of Canada Limited for the purchase of Bruce Heavy Water Plant "A". Under the purchase agreement, Ontario Hydro pays equal monthly instalments of blended principal and interest to December 28, 1992, with interest at the rate of 7.795%	207,223	216,184
Capitalized lease obligation for the head office building at 700 University Avenue, Toronto. The lease obligation is for the 30-year period ending September 30, 2005, payable in United States dollars at an effective interest rate of 8%	42,960	43,457
Capitalized lease obligations for transport and service equipment. Under these agreements, payments of equal monthly instalments of blended principal and interest will be made to 1988, at effective interest rates ranging from 6.8% to 10.8%	21,344	9,915
Liability for borrowed uranium. The liability represents the present value, discounted at an effective interest rate of 10.633%, of monthly lease payments and the estimated future replacement cost of a quantity of uranium borrowed in January, 1979 from Uranium Canada Limited for current consumption. The quantity borrowed is to be returned in December, 1983	37,803	—
	<u>309,330</u>	<u>269,556</u>

Payments required on the above debt, exclusive of interest, will total \$112 million over the next five years. The amount payable within one year is \$17 million (1978 — \$10.6 million).

13. Payment to Ontario Municipal Electric Association

The amount of this payment is equivalent to interest on the balance held for the benefit of Municipalities in the Reserve for Stabilization of Rates and Contingencies.

14. Changes in accounting policies and estimates

Changes in accounting policies and estimates, as described in the Summary of Significant Accounting Policies, were implemented effective January 1, 1979. As a result, the net income for the year ended December 31, 1979 has been increased (decreased) by the following amounts:

	<u>\$ millions</u>
Depreciation	
Adoption of straight-line basis for depreciation	(8)
Revision to service life estimates	12
Advance payments for fuel supplies	
Change in accounting for interest	7
Fuel for electric generation	
Change in accounting for interest	3
Pension plan	
Change in amortization period for unfunded liabilities	3
Research and development	
Change in accounting for planning and development costs	(31)
	<u>(14)</u>

15. Pension plan

The most recent actuarial valuation of the pension plan, at December 31, 1978, reported that Ontario Hydro's unfunded liability was approximately \$23 million (December 31, 1977 — \$133 million). The significant actuarial assumptions used in the 1978 valuation (1977 valuation) were:

- rate used to discount future investment income and benefits 7% (1977 — 6%)
- salary escalation rate 6.75% (1977 — 5.5%)
- average retirement age 62.4 for males, 61.0 for females (1977 — 62.1 and 60.7)
- common stocks are valued at 5 year average (1977 — 4 year average)

The net effect of the above changes in valuation assumptions, together with favourable investment experience, combined to reduce the estimated unfunded liability by \$95 million.

The pension plan costs for 1979 were \$48 million (1978 — \$80 million), including \$4 million (1978 — \$36 million) for the amortization of past service costs. The decrease of \$32 million in the amount amortized for past service costs resulted mainly from the reduction in the unfunded liability described above, and the change in the amortization period described in the Summary of Significant Accounting Policies and referred to in note 14.

16. Net additions to fixed assets

Net additions to fixed assets are capital construction program expenditures, net of proceeds on sales of assets. In 1979, net additions to heavy water reflect proceeds on sales amounting to \$103 million. For 1980, net additions to fixed assets are forecast at \$1,740 million.

17. Research and development

In 1979, approximately \$39 million of research and development costs were charged to operations and \$4 million were capitalized.

Pension and Insurance Fund Statement of Assets as at December 31, 1979

	1979	1978
	\$'000	\$'000
Fixed income securities		
Government and government-guaranteed bonds ..	286,541	159,271
Corporate bonds	143,125	131,069
First mortgages	340,026	287,377
Total fixed income securities	769,692	577,717
Equities — corporate shares	269,531	262,404
Cash and short-term investments	87,957	124,295
Total investments	1,127,180	964,416
Accrued interest and dividends	15,915	11,827
Receivable from Ontario Hydro	748	1,786
	<u>1,143,843</u>	<u>978,029</u>

Notes

1. The most recent actuarial valuation of the pension plan, at December 31, 1978, reported that Ontario Hydro's unfunded liability was approximately \$23 million. This unfunded liability is being amortized over a fifteen year period.
2. In the above statement of assets, bonds are included at amortized cost, first mortgages at balance of principal outstanding and shares at cost. Total bonds and shares at December 31, 1979 with a book value of \$699 million had a market value of \$732 million. (1978 book value \$553 million — market value \$576 million).

Auditors' Report

(Pension and Insurance Fund)

We have examined the statement of assets of The Pension and Insurance Fund of Ontario Hydro as at December 31, 1979. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement presents fairly the assets of the fund as at December 31, 1979.

Toronto, Canada
March 10, 1980

CLARKSON GORDON
Chartered Accountants



Board of Directors

- *** **Arthur J. Bowker**, Ottawa
Vice-Chairman, Ontario Hydro
Research Officer
National Research Council
- †† **Alan B. Cousins**, Wallaceburg
President, Ideal Stampings Limited
- †† **A. Ephraim Diamond**, Willowdale
Former Chairman of the Board
and Chief Executive Officer
Cadillac Fairview Corporation Limited
- †† **William Dodge**, O.C., Ottawa
Chairman, Audit Committee
Former Secretary-Treasurer
Canadian Labour Congress
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Director
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Queen's University
- †† Member of the Audit Committee
† Member of the Management Resources Committee
*** Member of the Finance Committee
• Member of the Social Responsibility Committee

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Eastern Region

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Belleville K8N 5C3

Niagara Region

J. W. H. Kerr
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Hamilton L8N 3B9

Northeastern Region

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590 Graham Drive
North Bay P1B 1L4

Northwestern Region

D. D. Haig
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Thunder Bay P7A 4L5

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